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In-Situ Remediation Pilot Study Report

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Project No. 47175 **January 2002**

ELEMENTIS, INC.

IN-SITU REMEDIATION PILOT STUDY REPORT

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EASTON, PENNSYLVANIA

Submitted To:
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1.0 INTRODUCTION

1.1 Background and Objectives

Elementis Pigments, Inc. (Elementis) manufactures high purity iron oxide pigments for various pharmaceutical and industrial applications at their facility at Wood Avenue and North 13th Street in Easton, Pennsylvania. Petroleum and chemical releases to the subsurface environment were previously delineated at the facility. Previous site investigations identified and delineated gasoline and heating oil free product and associated soil and groundwater contamination within three areas of the facility.

A pilot study was conducted to determine the feasibility of using active in-situ remediation technologies for remediation of the three areas of environmental contamination at the facility. The remediation technologies selected included bioslurping and vacuum enhanced dual-phase extraction (DPE). The pilot study objectives were to determine the feasibility of using bioslurping and/or DPE for aggressive light non-aqueous phase liquid (LNAPL) recovery in the test areas and obtaining site-specific data for use in design of a full-scale remedial system.

1.2 Description of Study Areas

As noted above, three areas of contamination exist at the facility. The gasoline-impacted area located west of and below the Acid Plant is identified as Area No. 1 for this report. The heating oil-impacted area located north of Building 16 is identified as Area No. 2 for this report. Sulfuric acid was also previously identified in subsurface soils and groundwater near Area No. 2. Product-stained rocks were observed in the underground stream chase (Spring Brook) adjacent to Building 17, indicating that the migration of floating product may be occurring in this area. This area is identified as Area No. 3 for this report. The locations of these areas are presented on Figure 1.

2.0 PILOT STUDY TECHNOLOGIES AND METHODOLOGIES

The pilot study was conducted from October 15 through October 19, 2001, and from October 22 to October 24, 2001. For each area, a bioslurping pilot test was initially conducted followed by a DPE pilot test. Area No. 1 was tested first, followed by tests at Area Nos. 2 and 3. An extended DPE test was conducted at Area No. 1 after an initial test on all three areas.

The initial pilot test conducted in Area Nos. 2 and 3 indicated that further pilot testing of these areas was not necessary to meet the objectives of the pilot study. Extended pilot testing for Area No. 1 was conducted for several reasons, including the following:

- To confirm that the initial results were valid given the degree of pressure variation observed during the first test;
- To further evaluate the affect DPE has on the collection/movement of free product in this area; and
- To evaluate the potential for system short-circuiting into a newly completed underground storage tank (UST) excavation near the extraction point for Area No. 1. Large excavations can provide significant preferential flow mechanisms due to the typical granular nature of UST backfill material.

The first phase of the pilot study for each area focused on bioslurping as a remedial alternative for aggressive LNAPL recovery. Bioslurping consists of applying a high vacuum via a drop tube at the oil/water interface. The intent of bioslurping is to maximize product recovery and minimize water recovery. The high vacuum induces flow of free product to the recovery point, while the resultant air flow volatilizes volatile organics from the vadose zone soils and enhances microbial degradation of contaminants by aerobic bacteria naturally present in the soil. The intent of the bioslurping testing for this pilot study was to determine the effectiveness of product recovery and the magnitude of vacuum influence. Microbial activity and response were not target parameters for measurement during this study.

The second phase of the pilot testing used vacuum-enhanced DPE to attempt to recover total fluids from a given extraction point. Under amenable conditions, DPE will influence migration of the overall product plume toward the DPE well resulting in effective product recovery.

DPE testing includes advancing a drop tube below the groundwater surface within the well to recover floating product and groundwater. For wells that cannot be fully dewatered in this manner, a second drop tube that is located above the water surface is used to extract soil vapor. For wells that can be fully dewatered, a single drop tube can be used for extraction of groundwater and soil vapor.

The testing was performed using one of Earth Tech's trailer-mounted mobile pilot testing systems. The trailer included a single liquid ring pump, followed by a knockout tank and oil/water separator. All

recovered groundwater was pumped through liquid-phase granular activated carbon (GAC) and stored in a tank for future disposal. Floating free product was skimmed from the oil/water separator and collected in a drum for disposal. Recovered vapors were vented directly to the atmosphere, with field photo ionization detector (PID) monitoring and laboratory analysis of the discharged air stream.

Prior to beginning the pilot study, background water levels and vacuum readings were collected in each test area at each of the monitoring points around each extraction well (see Table 1). After applying vacuum at the extraction well for an area, the water levels and vacuum were periodically measured at the surrounding monitoring points.

3.0 PRE-TESTING ACTIVITIES

The Remedial Action Proposal submitted to Elementis served as the Work Plan for the project. A Health and Safety Plan for the Pilot Study also was prepared. A Request for Determination of Requirement for Plan Approval/Operating Permit Application was submitted to the PADEP, and approval for air emissions from the treatment unit was received on October 11, 2001.

Three new monitoring points were installed (GIP-1, FOP-1 and FOP-2) to allow monitoring of subsurface conditions during the tests. These monitoring points were installed to supplement the existing monitoring wells and to ensure the presence of optimally screened and located monitoring points for the pilot study. The new monitoring points were installed using a hollow-stem auger drill rig and were constructed with polyvinyl chloride (PVC) well screen and casing and steel flush-mount well covers. Well construction details for these new monitoring points are provided in Appendix A. The locations of these monitoring points are presented on Figure 1.

4.0 PILOT STUDY RESULTS

A summary of pilot study operating conditions is presented in Table 2. Induced vacuum data is presented in Tables 3 through 5. Groundwater level and product thickness data are presented in Table 6. Groundwater data is presented in Table 7. Mass reduction rates are presented in Tables 8 and 9.

4.1 Area No. 1

The extraction point for the Area No. 1 pilot test was MW-11. Twelve monitoring points were monitored during the tests in this area, as indicated on Tables 3 and 6. As noted above, two tests were conducted for this area (initial test and extended test). The initial test (Test A) was conducted between October 15 and 18, 2001, for a total of 51 hours. The initial test included bioslurping for approximately 32 hours followed by DPE for approximately 19 hours. The extended test (Test B) was conducted between October 22 and 24, 2001 for approximately 36 hours using DPE only.

4.1.1 Bioslurping

The drop tube was extended 5.5 feet below grade to the product/groundwater interface for the bioslurping test. After approximately 8 hours of test operation, the drop tube was lowered to 6 feet below grade to determine if this change would result in the recovery of additional floating product and/or groundwater. No increase in product or groundwater recovery was observed after approximately 10 minutes, so the drop tube was then raised back to 5.5 feet below grade.

After an initial recovery of floating product, no significant product was recovered during this bioslurping test. Therefore, bioslurping was determined to be ineffective at this location. This may be due to the relatively high permeability of the overlying soils and the shallow nature of groundwater in this area. It is likely that air was preferentially pulled through the overlying soil, minimizing the potential for product movement along the oil/water interface.

4.1.2 Dual Phase Extraction

The drop tube was extended to within 6 inches of the bottom of MW-11 (13.5 ft below grade) for the entire duration of the DPE test. The extraction point (MW-11) was easily dewatered using DPE. Therefore, the single drop tube was able to extract both product/groundwater and soil vapor.

Groundwater levels and product thicknesses were influenced in monitoring points in the immediate vicinity of MW-11. The radius of influence observed during the DPE tests steadily increased throughout the tests.

The groundwater recovery flow for MW-11 for both DPE tests was approximately one gallon per minute (gpm). Groundwater elevation influences were observed in monitoring points P-3, GIP-1 and MW-22 as follows:

P-3	0.45 foot decrease
GIP-1	0.66 foot decrease
MW-22	0.47 foot decrease

A steady increase in free product thickness was observed in monitoring points P-3 and MW-22 during the initial test. A 0.03 foot increase in product thickness was observed in P-3 during the initial test, and a 0.04 foot increase was observed during the second test. Likewise, a 0.07 foot increase in product thickness was observed in MW-22 during the initial test, and a 0.1 foot increase was observed during the second test. These results indicate free product migration toward the extraction point (MW-11) during the pilot study.

The radius of influence during the DPE test steadily increased throughout the test. Monitoring point P-3, as expected, yielded the quickest response, followed by GIP-1, MW-24 and MW-22.

The effective radius of influence during the first test extended to approximately 26 feet from MW-11. Evidence of vacuum influence was not observed in MW-22 or MW-24 until after approximately two full days of DPE operation. Monitoring points P-3 and GIP-1 reported relatively quick responses to DPE application on MW-11.

Pressure readings at many of the monitoring points fluctuated between positive and negative pressure suggesting minor water table fluctuations. The monitoring points noted above were the only points that reflected consistent negative pressure readings, which is indicative of vacuum influence.

The pressure variations reported in the initial test were confirmed in the extended test. The observations made during the extended test provided the additional data needed to determine that the native clay soils may play a role in the pressure variations.

Positive pressure observations, as noted above, generally result from groundwater level increases. Level increases of as small as 0.01 foot can result in a positive pressure reading in a well. Positive pressure observations were made in several of the monitoring points shortly after system startup, suggesting that vacuum influence extended to these points. This influence was likely the result of the tight nature (high porosity - low permeability) of the residual clayey soils in this area. As the vacuum was applied to the soil profile, the water table was uplifted slightly due to pore space compression and the water's inability to move freely through the soil pores. As water was sporadically released from the pore spaces, the observed pressures fluctuated. The degree of fluctuation was a function of the soil's ability to release the stored water.

No evidence of vacuum influence was observed at either of the two monitoring points that were completed in the former UST excavation that is located approximately 50 feet upgradient of MW-11.

The pressure variations observed during the extended test suggest that vacuum influence from the DPE testing may extend as far as monitoring point MW-6, approximately 80 feet downgradient of MW-11. The results of the extended test also indicate that this influence is linear in nature, not radial from the point of extraction.

System influent and effluent groundwater sample results indicated that activated carbon treatment was effective during the tests. Vapor sample results indicated that volatile organics were present in the recovered vapors. Table 7 presents a summary of the analytical results for recovered groundwater during the pilot study. Tables 8 and 9 present calculated mass recovery rates during the DPE tests.

4.2 Area No. 2

The extraction point for the Area No. 2 pilot test was MW-31. Sixteen monitoring points were monitored during the test for this area, as indicated on Tables 4 and 6. The test for this area was conducted on October 18, 2001, for a total of 1.5 hours.

4.2.1 Bioslurping

The drop tube was extended 12.5 feet below grade to the product/groundwater interface for the duration of the bioslurping test. The bioslurping test was conducted for approximately one hour. Bioslurping was initially effective, as a thick heating oil product was recovered under bioslurping conditions. However, after initial recovery no significant floating product was recovered under these conditions and no significant impact to the surrounding groundwater elevations was observed. Therefore, bioslurping was determined to be ineffective at this location. As noted above for Area No. 1, it is likely that air was preferentially pulled through the overlying soil, minimizing the potential for product movement along the oil/water interface.

4.2.2 Dual Phase Extraction

A limited DPE test was conducted for 0.5 hour in this area to define the potential effectiveness of this technology. The drop tube was extended 14 feet below grade for the duration of the DPE test. The DPE test indicated that no significant floating product was recovered and no significant impact to the surrounding groundwater elevations was observed. A vacuum of 24.5 inches of mercury (in Hg) was applied to the drop tube in MW-31, which resulted in a groundwater recovery flow rate of 8 to 9 gpm. This flow is relatively high for a DPE pilot-scale system, and still did not allow dewatering of MW-31 and did not influence groundwater elevations in the surrounding area. This recovery flow exceeded the capacity of the treatment system for sustained testing. In addition, due to the extremely low pH (1.33 to 4 pHU) of the groundwater in this area, sustained extraction of groundwater would have increased the potential for damage to the treatment system equipment. Due to the lack of product recovery and groundwater level influence, as well as the limitations of the treatment system equipment, the duration of the DPE test for this area was limited.

4.3 Area No. 3

The extraction point for the Area No. 3 pilot testing was RW-10. Five monitoring points were monitored during the test for this area, as indicated on Tables 5 and 6. The test for this area was conducted on October 19, 2001, for a total of 3.5 hours.

4.3.1 Bioslurping

The drop tube was extended 9 feet below grade to the product/groundwater interface for approximately 1.5 hours, and to 9.5 feet below grade for approximately 2 hours. Bioslurping applied to RW-10 recovered a minimal amount of an oil product that appeared to be similar to heating oil. After initial recovery of floating product, no significant product was recovered under these conditions and no significant impact to the surrounding groundwater elevations were observed. Therefore, bioslurping was determined to be ineffective at this location. Unlike Area Nos. 1 and 2, the ground surface around this location was covered by a concrete floor slab, which may have reduced the potential for air to flow preferentially through the overlying soil. However, the presence of the nearby stream bank may also have allowed preferential air flow through the stream bank, minimizing the potential for product movement along the oil/water interface.

4.3.2 Dual Phase Extraction

The drop tube was extended 14 feet below grade for approximately 15 minutes. As was observed in MW-31, a relatively high groundwater flow rate prevented dewatering of well RW-10, and therefore prevented impact to the surrounding groundwater levels. No significant floating product was recovered during the DPE test.

5.0 PILOT STUDY CONCLUSIONS AND RECOMMENDATIONS

5.1 Area No. 1

The pilot study revealed that bioslurping was ineffective and DPE was effective for recovery of floating product in Area No. 1. While a small volume of product was recovered during the pilot study, the ability to dewater MW-11 and influence floating product/groundwater elevations and vacuum in surrounding wells indicates that DPE could be effective over a longer operating time period at this location. Continued dewatering of MW-11 and/or other wells through DPE in this area would result in migration of floating product to the extraction point(s), with product capture by a DPE system.

Based upon the results of the pilot study, implementation of DPE for product recovery in Area No. 1 is recommended. A mobile DPE system can be used on an interim remedial action basis using the existing monitor wells as extraction points. The extracted groundwater can be effectively treated with activated carbon and discharged to the existing POTW. Recovered product can be collected and recycled. An interim remedial action monitoring program can be conducted during the DPE implementation to assess overall effectiveness and required operational time period. Continued quarterly groundwater monitoring will be conducted to assess the overall impact on the aquifer.

5.2 Area No. 2

The pilot study revealed that a bioslurping system could recover floating product from limited areas within Area No. 2; however, the overall impact to the contaminated area would likely be minimal due to adverse subsurface conditions. A DPE system would not be effective due to high groundwater recovery flow with no effect on surrounding groundwater levels. The extremely low pH values for the groundwater in this area also would require use of special acid-resistant treatment system components.

Due to the lack of significant product recovery and acidic groundwater conditions in this area, continued periodic manual bailing of observed product is recommended for Area No. 2. Aggressive product recovery in this area is not feasible due to site conditions. The current floating product plume is stable and not adversely impacting groundwater quality.

5.3 Area No. 3

The pilot study revealed bioslurping and DPE were ineffective in Area No. 3. The results of the pilot study in this area indicate that a bioslurping system will not recover significant product from the plume. A DPE system would not be effective due to high groundwater recovery flow with no effect on surrounding groundwater elevations and product thickness.

Due to the lack of significant product recovery in this area, continued periodic manual bailing of observed product and containment of any product seeps is recommended for Area No. 3. Aggressive product

recovery in this area is not feasible due to site conditions. The current floating product plume is contained and not adversely impacting groundwater or surface water quality.

TABLES

TABLE 1
BACKGROUND MEASUREMENTS
IN SITU REMEDIATION PILOT STUDY
Elementis Pigments, Easton, Pennsylvania
October 15-24, 2001

Test Area	Well	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Pressure (in of H_2O)
TEST AREA NO. 1 - Tests A&B (Readings 10/15/01)	MW-11*	5.57	5.60	0.03	+0.05
	MW-28	---	6.58	---	+0.13
	MW-4	---	7.10	---	+0.01
	MW-6	---	4.99	---	+0.08
	MW-26	---	6.65	---	0
	MW-25D	---	5.32	---	0
	MW-24	---	4.52	---	+0.45
	P-3	4.97	5.88	0.91	-0.02
	MW-23D	---	6.02	---	+0.05
	GIP-1	---	5.84	trace	0
	MW-22	6.79	7.02	0.23	+0.58
	MW-21	---	8.37	---	0
	MW-20	---	11.60	---	0
TEST AREA NO. 2 (Readings 10/17/01)	MW-31*	12.61	13.52	0.91	NR2
	MW-30	---	10.34	---	0
	MW-12	12.87	13.62	0.75	0
	MW-29	8.60	8.66	0.06	0
	MW-33	---	6.38	---	+0.01
	MW-32	---	12.79	---	+0.01
	GP-3	---	8.61	---	0
	GP-4	---	8.50	---	0
	GP-12	---	8.40	---	0
	GP-15	---	8.02	---	+0.01
	FOP-1	---	11.34	---	+0.01
	FOP-2	10.70	10.71	0.01	0
TEST AREA NO. 3 (Readings 10/19/01)	RW-10*	8.40	8.98	0.58	NR1
	BH-13	11.18	12.00	0.82	0
	BH-15	NR2	NR2	NR2	0
	BH-12	11.00	NR2	NR2	0
	BH-8	---	19.63	---	0
	BH-9	---	19.06	---	0

NOTE:

*	extraction well for test area
NR1	measurement not collected at extraction well
NR2	measurement not collected due to access limitation for PVC casing
---	no significant product thickness was encountered

TABLE 5
VAPOR EXTRACTION INDUCED VACUUM DATA - TEST AREA NO. 3
IN SITU REMEDIATION PILOT STUDY
Elementis Pigments, Easton, Pennsylvania
October 19, 2001

Date	Extraction Vacuum/ Well	Time	BH-13	BH-15	BH-12	BH-8	BH-9
10/19/2001	RW-10 15" Hg	1015					
		1100	0	0	0	0	0
		1130	-0.01	0	0	0	0
		1230	0	0	0	0	0
		1300	0	0	0	0	0

NOTE: All pressure readings for monitoring points listed above are in inches of water (in H2O).

TABLE 6
GROUNDWATER LEVEL AND PRODUCT THICKNESS MEASUREMENTS
IN SITU REMEDIATION PILOT STUDY
Elementis Pigments, Easton, Pennsylvania
October 15-24, 2001

Test Area	Monitoring Point	Background			10/15/01 1615 (Bioslurping)			10/16/01 0845 (Bioslurping)			10/16/01 1120 (Bioslurping)			10/16/01 1400 (Bioslurping)			10/17/01 0720 (Bioslurping)			10/17/01 1420 (DPE)			10/17/01 1745 (DPE)			10/18/01 0755 (DPE)		
		Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)
1 (Test A)	MW-22	6.79	7.02	0.23	6.72	6.93	0.21	6.76	6.98	0.22	6.81	7.07	0.26	7.07	7.36	0.29	7.22	7.42	0.20	7.23	7.46	0.23	7.33	7.63	0.30	7.27	7.47	0.20
	GIP-1	---	5.84	trace	trace	5.93	trace	---	5.97	---	---	6.01	---	---	6.19	---	---	6.25	---	---	6.38	---	---	6.50	---	---	6.37	---
	P-3	4.97	5.88	0.91	5	5.93	0.93	5.03	5.95	0.92	5.09	6.01	0.92	5.13	6.05	0.92	5.22	6.15	0.93	5.29	6.21	0.92	5.38	6.33	0.95	5.41	6.35	0.94

Test Area	Monitoring Point	10/23/01 0800 (DPE)			10/23/01 1545 (DPE)			10/24/01 0845 (DPE)		
		Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)
1 (Test B)	MW-22	6.75	6.97	0.22	6.80	7.03	0.23	6.79	7.02	0.23
	GIP-1	---	6.09	---	---	6.09	---	5.73	6.75	1.02
	P-3	5.58	6.60	1.02	5.72	6.78	1.06	---	6.08	---
	UST-1	---	6.93	---	---	---	---	---	---	---
	UST-2	---	7.52	---	---	---	---	---	---	---

Test Area	Monitoring Point	Background		
		Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)
2	MW-12	12.87	13.62	0.75
	MW-29	8.60	8.66	0.06
	FOP-2	10.70	10.71	0.01

Test Area	Monitoring Point	Background		
		Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)
3	BH-13	11.18	12.00	0.82

NOTES:

1 Area No. 1 Test A started 10/15/01 at 1405 hrs, stopped at 1720; restarted 10/16/01 at 0720, stopped 10/18/01 at 0800
2 Bioslurping test for Test A from start to 10/17/01 at 1310 hrs; Dual-Phase Extraction (DPE) test for Test A from 10/17/01 at 1310 hrs to end of Test A.
3 Test B was for DPE only. Test B started 10/22/01 at 1515 hrs, stopped 10/24/01 at around 0330 hrs (unattended at shutdown). Re-started 10/24/01 at 0720 hrs and stopped at 1000 hrs.
4 Groundwater level influences were not observed in UST-1 and UST-2 during Test B for Area No. 1 (in former UST excavation; not in existence during Test A); no readings recorded beyond initial values presented above.
5 Area No. 2 test started 10/18/01 at 1610 hrs, stopped at 1730 hrs. Both bioslurping and DPE were tested. Flow rate of 8 to 9 gpm from MW-31 during DPE test, and water level did not drop in MW-31. Water level and product thickness readings were not collected from surrounding monitoring points.
6 Area No. 3 test started 10/19/01 at 1040 hrs, stopped at 1315 hrs. This was primarily a bioslurping test, and DPE was tested briefly (groundwater flow rate too high to allow sustained DPE test). Water level and product thickness readings were not collected from surrounding monitoring points.

TABLE 7
DPE EXTRACTION WELL GROUNDWATER DATA
IN SITU REMEDIATION PILOT STUDY
Elementis Pigments, Easton, Pennsylvania
October 18, 2001

Sample ID Sampling Date Units	MW-11 CI 10/18/01 ug/L	MW-31 CI 10/18/01 ug/L	RW-10 CI 10/19/01 ug/L
UST Volatiles by SW-846 8021B			
1,2-Dichloroethane	5.0 U	NA	NA
1,2-Dibromoethane (EDB)	5.0 U	NA	NA
Benzene	5.0 U	1.0 U	1.0 U
Toluene	5.0 U	2.0	1.0 U
Ethylbenzene	87	55	4.5
Total Xylenes	200	150	38
Methyl tert-Butyl Ether	NA	1.0 U	1.9
Naphthalene	220	350	290
Isopropylbenzene (cumene)	7.2	11	4.4
EDB by SW-846 8011			
Ethylene dibromide	0.028 U	NA	NA
PAHs by SW-846 8270C			
Naphthalene	230	880	580
Acenaphthylene	9 U	94 U	96 U
Acenaphthene	9 U	94 U	150
Fluorene	10	94 U	210
Phenanthrene	17	170	410
Anthracene	9 U	94 U	96 U
Fluoranthene	9 U	94 U	96 U
Pyrene	9 U	94 U	96 U
Benzo(a)anthracene	9 U	94 U	96 U
Chrysene	9 U	94 U	96 U
Benzo (b) fluoranthene	9 U	94 U	96 U
Benzo (k) fluoranthene	9 U	94 U	96 U
Benzo (a) pyrene	9 U	94 U	96 U
Indeno (1,2,3-cd)pyrene	9 U	94 U	96 U
Dibenz (a,h) anthracene	9 U	94 U	96 U
Benzo (g,h,I) perylene	9 U	94 U	96 U
Total Confident Conc. VOAs (s)	**551**	**1268**	**1399**
Total Estimated Conc. VOA TICs (s	0	0	0

Qualifiers
U - The compound was not detected at the indicated concentration.
NA not analyzed

TABLE 8
MASS REDUCTION RATES - AREA NO. 1
IN SITU REMEDIATION PILOT STUDY
Elementis Pigments, Easton, Pennsylvania
October 18, 2001

	MW	Soil Vapor Results
Pilot Test		MW-11 AIR STOP @ 15 SCFM
Sample Date/Time		10/18/01 0745
Methylene Chloride	85	2200
lbs./hr		0.0004363
lbs./day		0.010472
Benzene	87	140.0
lbs./hr		0.0000284
lbs./day		0.000682
Toluene	92	670
lbs./hr		0.0001438
lbs./day		0.003452
Ethylbenzene	106	1,700.0
lbs./hr		0.0004205
lbs./day		0.010091
4-Ethyltoluene	120	190.0
lbs./hr		0.0000532
lbs./day		0.001277
1,2,4-Trimethylbenzene	120.1938	120.0
lbs./hr		0.0000361
lbs./day		0.000865
m.p-xylene	318.501	2400
lbs./hr		0.0017836
lbs./day		0.042807
o-xylene	318.501	300
lbs./hr		0.0002230
lbs./day		0.005351
TOTAL REMOVAL RATE (lbs/hr):		0.003
TOTAL REMOVAL RATE (lbs/day):		0.075

	Groundwater Results
Pilot Test	MW-11 CI @ 0.5 gpm
Sample Date/Time	10/18/01 1147
Ethylbenzene	87
Recovery Rate (lbs/hr)	2.2E-05
Recovery Rate (lbs/day)	5.2E-04
Isopropylbenzene (Cumene)	7.2
Recovery Rate (lbs/gal)	1.8E-06
Recovery Rate (lbs/day)	4.3E-05
Naphthalene	230
Recovery Rate (lbs/gal)	5.8E-05
Recovery Rate (lbs/day)	1.4E-03
Xylene (total)	200
Recovery Rate (lbs/gal)	5.0E-05
Recovery Rate (lbs/day)	1.2E-03
Fluorene	10.0
Recovery Rate (lbs/gal)	2.5E-06
Recovery Rate (lbs/day)	6.0E-05
Phenanthrene	17.0
Recovery Rate (lbs/gal)	4.3E-06
Recovery Rate (lbs/day)	1.0E-04
TOTAL REMOVAL RATE (lbs/hr):	1.4E-04
TOTAL REMOVED (lbs./day)	3.3E-03

SUMMARY	MW-11
Vapor Phase (lbs/day)	0.075
Aqueous Phase (lbs/day)	0.003
GRAND TOTAL (lbs/day):	0.078

Soil vapor concentations and groundwater results reported in parts per billion (ppbv).

lb. Removal formula: [Concentration in ppbv x 0.000112 (constant) x molecular weight x CFM of air]/[30 days/month * 24 hrs/day x 1000ppmv/ppbv] = lbs. organic per hour.

TABLE 9
MASS REDUCTION RATES - AREA NO. 3
IN SITU REMEDIATION PILOT STUDY
Elementis Pigments, Easton, Pennsylvania
October 19, 2001

	MW	Soil Vapor Results
Pilot Test		RW-10 AIR STOP @ 12 SCFM
Sample Date/Time		10/19/01 1310
Methylene Chloride	85	3
lbs./hr		0.0000005
lbs./day		0.000011
Benzene	87	21
lbs./hr		0.0000034
lbs./day		0.000082
Toluene	92	77
lbs./hr		0.0000132
lbs./day		0.000317
Ethylbenzene	106	71
lbs./hr		0.0000140
lbs./day		0.000337
4-Ethyltoluene	120	89
lbs./hr		0.0000199
lbs./day		0.000478
1,2,4-Trimethylbenzene	120.1938	75
lbs./hr		0.0000168
lbs./day		0.000404
m.p-xylene	318.501	350
lbs./hr		0.0002081
lbs./day		0.004994
o-xylene	318.501	200
lbs./hr		0.0001189
lbs./day		0.002854
1,3,5-Trimethylbenzene	120.1938	54
lbs./hr		0.0000121
lbs./day		0.000291
Chloroform	34.6	2
lbs./hr		0.0000001
lbs./day		0.000003
TOTAL REMOVAL RATE (lbs/hr):		0.0004
TOTAL REMOVAL RATE (lbs/day):		0.0098

	Groundwater Results
Pilot Test	RW-10 CI @ 0.9 gpm
Sample Date/Time	10/19/01 1315
Ethylbenzene	4.5
Recovery Rate (lbs/hr)	2.0E-06
Recovery Rate (lbs/day)	4.9E-05
Isopropylbenzene (Cumene)	4.4
Recovery Rate (lbs/hr)	2.0E-06
Recovery Rate (lbs/day)	4.8E-05
Naphthalene	580
Recovery Rate (lbs/hr)	2.6E-04
Recovery Rate (lbs/day)	6.3E-03
Xylene (total)	38
Recovery Rate (lbs/hr)	1.7E-05
Recovery Rate (lbs/day)	4.1E-04
Methyl tert-Butyl Ether	1.9
Recovery Rate (lbs/hr)	8.6E-07
Recovery Rate (lbs/day)	2.1E-05
Acenaphthene	150
Recovery Rate (lbs/hr)	6.8E-05
Recovery Rate (lbs/day)	1.6E-03
Phenanthrene	410
Recovery Rate (lbs/hr)	1.8E-04
Recovery Rate (lbs/day)	4.4E-03
Fluorene	210.0
Recovery Rate (lbs/hr)	9.5E-05
Recovery Rate (lbs/day)	2.3E-03
TOTAL REMOVAL RATE (lbs/hr):	6.3E-04
TOTAL REMOVED (lbs./day)	1.5E-02

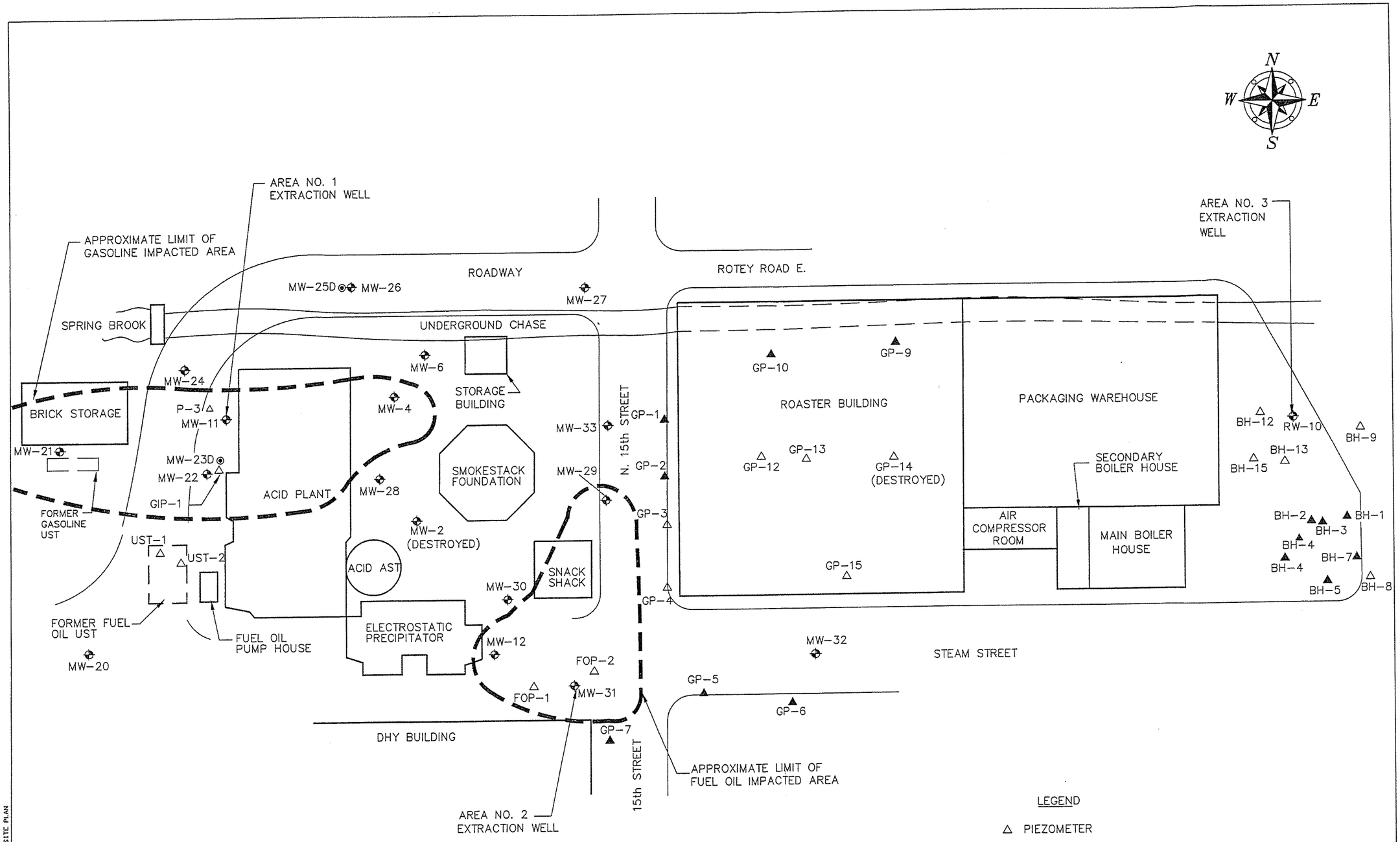
SUMMARY	RW-10
Vapor Phase (lbs/day)	0.010
Aqueous Phase (lbs/day)	0.015
GRAND TOTAL (lbs/day):	0.025

Soil vapor concentations and groundwater results reported in parts per billion (ppbv).

lb. Removal formula: [Concentration in ppbv x 0.000112 (constant) x molecular weight x CFM of air]/[30 days/month * 24 hrs/day x 1000ppmv/ppbv] = lbs. organic per hour.

FIGURE 1

SITE PLAN



L:\WORK\ENV\PROJECT\47175 ELEMENTIS-EASTON\SITE PLAN

ENVIRONMENTAL / CONSULTING ENGINEERS

EARTH TECH

REVISIONS

NO.	DATE	DESCRIPTION

PROJECT:
IN-SITU REMEDIATION PILOT STUDY
ELEMENTIS PIGMENTS, INC.
1525 WOOD AVENUE
EASTON, PENNSYLVANIA 18042-3186

CLIENT:
ELEMENTIS, INC
WYCOFFS MILL ROAD
HIGHTSTOWN, NEW JERSEY 08520

DRAWING TITLE:

SITE PLAN

DRAWN BY:	SEW
CHECKED BY:	MFB
SCALE:	1"= 40'
DATE:	12/17/01
PROJECT NO.	47175
DRAWING NO.	*FIGURE 1*

FOUR NESHAMINY INTERPLEX, SUITE 300
TREVOSE, PENNSYLVANIA 19053

APPENDIX A

WELL CONSTRUCTION LOGS

PROJECT NUMBER	CLIENT		BORING NUMBER
47175	Elementis		GIP-1
SITE LOCATION			ELEVATION & DATUM
Elementis Pigments, Inc. Easton, PA			NA
DRILLING CONTRACTOR	DRILLER		LOGGED BY
Tabasco Drilling Company	Barney (driller); Vince (helper)		R. Close M. (field) Bedard (office)
DRILLING RIG TYPE	BIT SIZE & TYPE	DATE STARTED	DATE COMPLETED
Diedrich D-120	4 1/4" HSA	10/10/2001	10/10/2001
WELL PERMIT NUMBER	BORING DIAMETER	FLUSH MOUNT COMPLETION	
	8 1/4"		

LEGEND

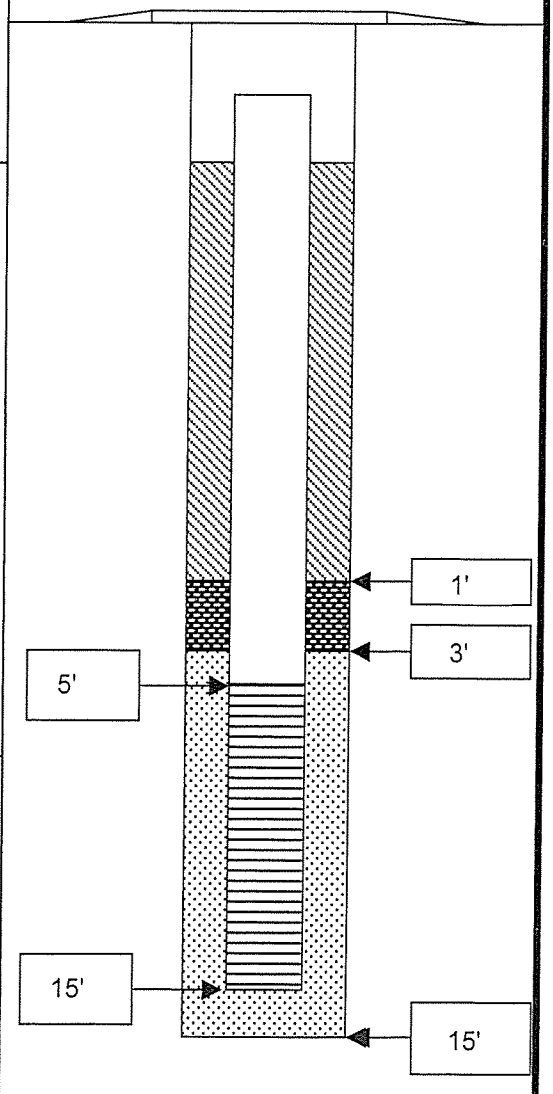
WELL RISER

WELL SCREEN

GROUT

SEAL

FILTER PACK



MATERIALS USED

10'	SCREEN - 2" OD .010-slot Schedule 40 PVC
5'	RISER - 2" OD Schedule 40 PVC
6	SAND - #1 silica quartz (50 pound bags)
0.5	SEAL - #00 Sand
7/8	BENTONITE - bucket
2	CEMENT MIX - bags
1	FLUSH MOUNT

DEVELOPMENT INFORMATION

Developed using whale pump; start 1510 hrs, ~1 gpm;
water cloudy light brown; gasoline odor, no sheen
slight rainbow shee at 1536 hrs
raised and lowered pump 7 times - water became
cloudier, then cleaner (cloudy white)
stopped developing at 1550 hrs
removed ~40 gal

PROJECT NUMBER	CLIENT	BORING NUMBER
47175	Elementis	FOP-1
SITE LOCATION		ELEVATION & DATUM
Elementis Pigments, Inc. Easton, PA		NA
DRILLING CONTRACTOR	DRILLER	LOGGED BY
Tabasco Drilling Company	Barney (driller); Vince (helper)	R. Close M. (field) Bedard (office)
DRILLING RIG TYPE	BIT SIZE & TYPE	DATE STARTED / DATE COMPLETED
Diedrich D-120	4 1/4" HSA	10/10/2001 / 10/10/2001
WELL PERMIT NUMBER	BORING DIAMETER	FLUSH MOUNT COMPLETION
	8 1/4"	

LEGEND

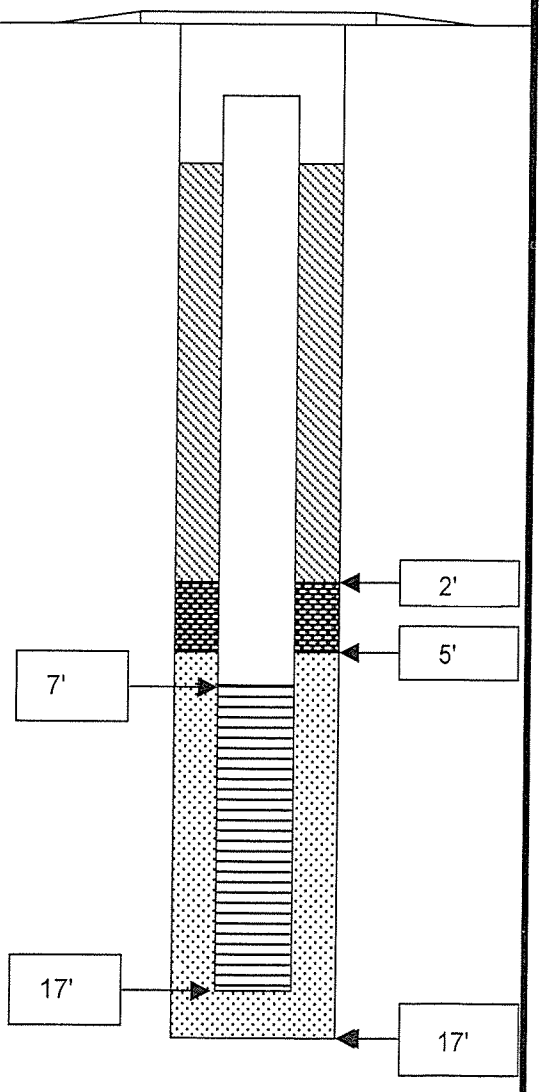
WELL RISER

WELL SCREEN

GROUT

SEAL

FILTER PACK



MATERIALS USED

10'	SCREEN - 2" OD .010-slot Schedule 40 PVC
7'	RISER - 2" OD Schedule 40 PVC
6	SAND - #1 silica quartz (50 pound bags)
1	SEAL - #00 Sand
1	BENTONITE - bucket
2	CEMENT MIX - bags
1	FLUSH MOUNT

DEVELOPMENT INFORMATION

Developed using whale pump; start 1620 hrs, ~1 gpm;
1624 hrs pH = 3.32
1630 hrs pH = 2.96
1640 hrs pH = 2.89
1651 hrs pH = 2.91
water cloudy brown - clean to cloudy white
stopped at 1700 hrs

PROJECT NUMBER	CLIENT		BORING NUMBER
47175	Elementis		FOP-2
SITE LOCATION			ELEVATION & DATUM
Elementis Pigments, Inc. Easton, PA			NA
DRILLING CONTRACTOR	DRILLER		LOGGED BY
Tabasco Drilling Company	Barney (driller); Vince (helper)		R. Close M. (field) Bedard (office)
DRILLING RIG TYPE	BIT SIZE & TYPE	DATE STARTED	DATE COMPLETED
Diedrich D-120	4 1/4" HSA	10/10/2001	10/10/2001
WELL PERMIT NUMBER	BORING DIAMETER	FLUSH MOUNT COMPLETION	
	8 1/4"		

LEGEND

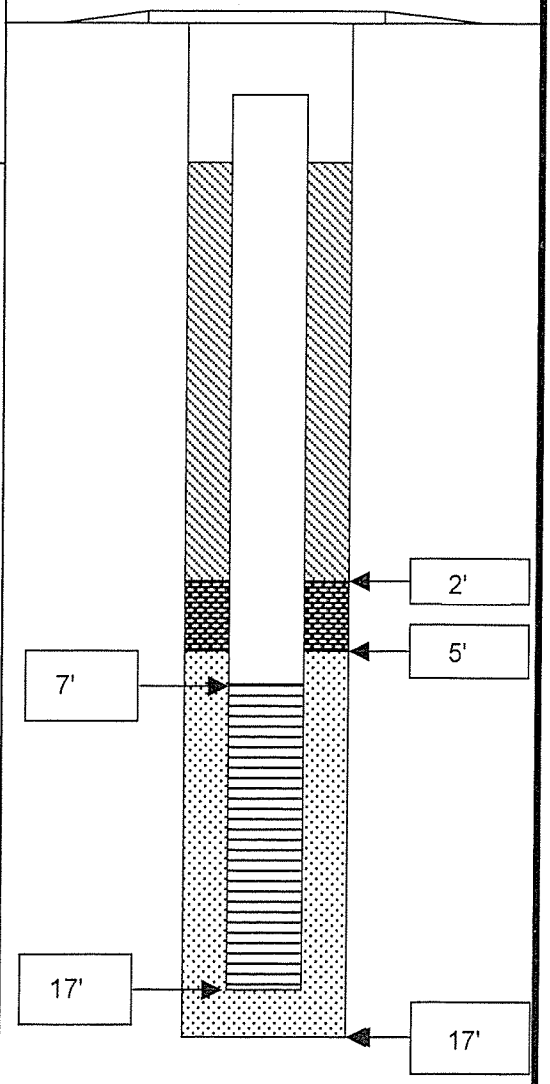
WELL RISER

WELL SCREEN

GROUT

SEAL

FILTER PACK



MATERIALS USED

10'	SCREEN - 2" OD .010-slot Schedule 40 PVC
7'	RISER - 2" OD Schedule 40 PVC
6	SAND - #1 silica quartz (50 pound bags)
1	SEAL - #00 Sand
1	BENTONITE - bucket
2	CEMENT MIX - bags
1	FLUSH MOUNT

DEVELOPMENT INFORMATION

Developed using whale pump; start 1702 hrs, ~1 gpm;
1703 hrs pH = 3.52
1712 hrs pH = 2.87
1720 hrs pH = 2.85
1728 hrs pH = 2.83
water cloudy brown to cloudy white
stopped at 1730 hrs

APPENDIX B

ANALYLITICAL DELIVERABLES

MW-11	CI
MW-11	CE
RW-10	CI
RW-10	CE
MW-31	CI
MW-31	CE
TW-1	
TW-2	
MW-11	AIR START
MW-11	AIR STOP
MW-10	AIR STOP

Lancaster Laboratories
Where quality is a science.

ANALYTICAL RESULTS

Prepared for:

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

717-795-8001

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 782955. Samples arrived at the laboratory on Friday, October 19, 2001.

Client Description	Lancaster Labs Number
MW-11CI Grab Water Sample	3710491
MW-11CE Grab Water Sample	3710492

1 COPY TO Earth Tech, Inc. Attn: Mr. Dave Russell

Questions? Contact your Client Services Representative
De Brooks at (717) 656-2300.

Respectfully Submitted,

Elizabeth A. Tomlinson
Sr. Chemist

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3710491

Collected:10/18/2001 11:47 by RC

Account Number: 01213

Submitted: 10/19/2001 09:25
Reported: 11/02/2001 at 07:07
Discard: 11/10/2001
MW-11CI Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

11CI-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
01055	Lead by SW-846 7421	7439-92-1	< 0.0030	0.0030	mg/l	1
08409	UST Volatiles by SW-846 8021B					
08504	1,2-Dichloroethane	107-06-2	< 5.0	5.0	ug/l	5
08521	1,2-Dibromoethane (EDB)	106-93-4	< 5.0	5.0	ug/l	5
08541	Benzene	71-43-2	< 5.0	5.0	ug/l	5
08543	Toluene	108-88-3	< 5.0	5.0	ug/l	5
08545	Ethylbenzene	100-41-4	87.	5.0	ug/l	5
08552	Isopropylbenzene (Cumene)	98-82-8	7.2	5.0	ug/l	5
08560	Naphthalene	91-20-3	220.	5.0	ug/l	5
08561	Xylene (total)	1330-20-7	200.	15.	ug/l	5
	Due to dilution of the sample made necessary by the high level of naphthalene, normal reporting limits were not attained.					
07879	EDB by SW-846 8011					
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	ug/l	1
	The surrogate recovery is outside the QC acceptance limits. Since the recovery is high and no EDB was detected, the data is reported.					
07805	PAHs by SW-846 8270C					
03947	Naphthalene	91-20-3	230.	38.	ug/l	4
03951	Acenaphthylene	208-96-8	< 9.	9.	ug/l	1
03954	Acenaphthene	83-32-9	< 9.	9.	ug/l	1
03956	Fluorene	86-73-7	10.	9.	ug/l	1
03963	Phenanthrene	85-01-8	17.	9.	ug/l	1
03964	Anthracene	120-12-7	< 9.	9.	ug/l	1
03966	Fluoranthene	206-44-0	< 9.	9.	ug/l	1
03967	Pyrene	129-00-0	< 9.	9.	ug/l	1
03970	Benzo(a)anthracene	56-55-3	< 9.	9.	ug/l	1
03971	Chrysene	218-01-9	< 9.	9.	ug/l	1
03975	Benzo(b)fluoranthene	205-99-2	< 9.	9.	ug/l	1
03976	Benzo(k)fluoranthene	207-08-9	< 9.	9.	ug/l	1
03977	Benzo(a)pyrene	50-32-8	< 9.	9.	ug/l	1

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3710491

Collected:10/18/2001 11:47 by RC

Submitted: 10/19/2001 09:25
Reported: 11/02/2001 at 07:07
Discard: 11/10/2001
MW-11CI Grab Water Sample
Elementis - PA

Account Number: 01213

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

11CI-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
03978	Indeno(1,2,3-cd)pyrene	193-39-5	< 9.	9.	ug/l	1
03979	Dibenz(a,h)anthracene	53-70-3	< 9.	9.	ug/l	1
03980	Benzo(g,h,i)perylene	191-24-2	< 9.	9.	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037
This sample was filtered in the lab for dissolved metals.

Laboratory Chronicle

CAT No.	Analysis Name	Method	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
01055	Lead by SW-846 7421	SW-846 7421	1	11/01/2001 11:23	Jessica L. Boyd	1
08409	UST Volatiles by SW-846 8021B	SW-846 8021B	1	10/29/2001 11:07	Todd T. Smythe	5
07879	EDB by SW-846 8011	SW-846 8011	1	10/24/2001 06:56	Tiffany A. Leyda	1
07805	PAHs by SW-846 8270C	SW-846 8270C	1	10/25/2001 00:49	Phillip R. Esbenshade	1
07805	PAHs by SW-846 8270C	SW-846 8270C	1	10/25/2001 11:33	Phillip R. Esbenshade	4
01127	GC VOA Water Prep	SW-846 5030B	1	10/29/2001 11:07	Todd T. Smythe	n.a.
05704	WW/TL SW 846 GFAA Digest tot	SW-846 3020A	1	10/26/2001 11:00	Christine M. Conlin	1
07786	EDB Extraction	SW-846 8011	1	10/23/2001 10:00	Deborah M. Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	10/23/2001 09:30	John A. Myers	1

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3710492

Collected:10/18/2001 11:55 by RC

Account Number: 01213

Submitted: 10/19/2001 09:25
Reported: 11/02/2001 at 07:08
Discard: 11/10/2001
MW-11CE Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

11CE-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
01055	Lead by SW-846 7421	7439-92-1	< 0.0030	0.0030	mg/l	1
08409	UST Volatiles by SW-846 8021B					
08504	1,2-Dichloroethane	107-06-2	< 1.0	1.0	ug/l	1
08521	1,2-Dibromoethane (EDB)	106-93-4	< 1.0	1.0	ug/l	1
08541	Benzene	71-43-2	< 1.0	1.0	ug/l	1
08543	Toluene	108-88-3	< 1.0	1.0	ug/l	1
08545	Ethylbenzene	100-41-4	< 1.0	1.0	ug/l	1
08552	Isopropylbenzene (Cumene)	98-82-8	< 1.0	1.0	ug/l	1
08560	Naphthalene	91-20-3	< 1.0	1.0	ug/l	1
08561	Xylene (total)	1330-20-7	< 3.0	3.0	ug/l	1
07879	EDB by SW-846 8011					
01087	Ethylene dibromide	106-93-4	< 0.028	0.028	ug/l	1
07805	PAHs by SW-846 8270C					
03947	Naphthalene	91-20-3	< 9.	9.	ug/l	1
03951	Acenaphthylene	208-96-8	< 9.	9.	ug/l	1
03954	Acenaphthene	83-32-9	< 9.	9.	ug/l	1
03956	Fluorene	86-73-7	< 9.	9.	ug/l	1
03963	Phenanthrene	85-01-8	< 9.	9.	ug/l	1
03964	Anthracene	120-12-7	< 9.	9.	ug/l	1
03966	Fluoranthene	206-44-0	< 9.	9.	ug/l	1
03967	Pyrene	129-00-0	< 9.	9.	ug/l	1
03970	Benzo(a)anthracene	56-55-3	< 9.	9.	ug/l	1
03971	Chrysene	218-01-9	< 9.	9.	ug/l	1
03975	Benzo(b)fluoranthene	205-99-2	< 9.	9.	ug/l	1
03976	Benzo(k)fluoranthene	207-08-9	< 9.	9.	ug/l	1
03977	Benzo(a)pyrene	50-32-8	< 9.	9.	ug/l	1
03978	Indeno(1,2,3-cd)pyrene	193-39-5	< 9.	9.	ug/l	1
03979	Dibenz(a,h)anthracene	53-70-3	< 9.	9.	ug/l	1
03980	Benzo(g,h,i)perylene	191-24-2	< 9.	9.	ug/l	1

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Analysis Report

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3710492

Collected:10/18/2001 11:55 by RC

Submitted: 10/19/2001 09:25
Reported: 11/02/2001 at 07:08
Discard: 11/10/2001
MW-11CE Grab Water Sample
Elementis - PA

Account Number: 01213

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

11CE-

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
	Commonwealth of Pennsylvania Lab Certification No. 36-037					
	This sample was filtered in the lab for dissolved metals.					

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
01055	Lead by SW-846 7421	SW-846 7421	1	11/01/2001 11:34	Jessica L. Boyd	1
08409	UST Volatiles by SW-846 8021B	SW-846 8021B	1	10/29/2001 05:24	Todd T. Smythe	1
07879	EDB by SW-846 8011	SW-846 8011	1	10/24/2001 07:28	Tiffany A. Leyda	1
07805	PAHs by SW-846 8270C	SW-846 8270C	1	10/25/2001 09:33	Phillip R. Esbenshade	1
01127	GC VOA Water Prep	SW-846 5030B	1	10/29/2001 05:24	Todd T. Smythe	n.a.
05704	WW/TL SW 846 GFAA Digest tot	SW-846 3020A	1	10/26/2001 11:00	Christine M. Conlin	1
07786	EDB Extraction	SW-846 8011	1	10/23/2001 10:00	Deborah M. Zimmerman	1
07807	BNA Water Extraction	SW-846 3510C	1	10/23/2001 09:30	John A. Myers	1

Analysis Request/Environmental Services Chain of Custo

Lancaster Laboratories
Where quality is a science.

For Lancaster Laboratories use only
Acct. # 1213 Sample # 371041-91-92

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Earth Tech Acct. #:
Project Name/#: DAVE Russell PWSID #:
Project Manager: Elementis P.O.#
Sampler: Rick Clare / Jason Hovis Quote #:
Name of state where samples were collected: PA

(2) (3) Matrix: (4) (5) Analyses Requested

Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	Soil	Water	Other	Total # of Containers	PAHs (1805)	PAUST (8409)	Pb of (1055)	EDB DBC (7879)	Remarks
MW-11 CI	10-18-01	1147	X			X		8	X	X	X	X	
MW-11 CE	10-18-01	1155	X			X		8	X	X	X	X	

For lab use only
FSC:
SCR #: 115845

Temperature of samples upon receipt (if requested)

(7) **Turnaround Time Requested** (TAT) (please circle): (Normal) Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax
Phone #: Fax #:

(8) **Data Package Options** (please circle if requested)
QC Summary
Type I (Tier I)
Type II (Tier II)
Type III (NJ Red. Del.)
Type IV (CLP)
Type VI (Raw Data)
GLP
Other

SDG Complete? Yes No

Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes No

Relinquished by:	Date	Time	Received by:	Date	Time
	10-17-01	1600		10/18/01	1440
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
				10/19/01	0925

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client

2102 Rev. 3/01

Lancaster Laboratories
Where quality is a science.

ANALYTICAL RESULTS

Prepared for:

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

717-795-8001

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 783129. Samples arrived at the laboratory on Saturday, October 20, 2001.

Client Description	Lancaster Labs Number
RW-10CI Grab Water Sample	3711530
RW-10CE Grab Water Sample	3711531
MW-31CI Grab Water Sample	3711532
MW-31CE Grab Water Sample	3711533

1 COPY TO Earth Tech, Inc. Attn: Mr. Dave Russell

Questions? Contact your Client Services Representative
De Brooks at (717) 656-2300.

Respectfully Submitted,

Jennifer N. Martell
Sr. Chemist/Coordinator

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3711530

Collected:10/18/2001 13:15 by RC

Account Number: 01213

Submitted: 10/20/2001 11:00
Reported: 10/29/2001 at 11:46
Discard: 11/06/2001
RW-10CI Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

W10CI

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
02102	UST Volatiles by SW-846 8021B					
00776	Benzene	71-43-2	< 1.0	1.0	ug/l	1
00777	Toluene	108-88-3	< 1.0	1.0	ug/l	1
00778	Ethylbenzene	100-41-4	4.5	1.0	ug/l	1
00779	Total Xylenes	1330-20-7	38.	3.0	ug/l	1
00780	Methyl tert-Butyl Ether	1634-04-4	1.9	1.0	ug/l	1
00781	Naphthalene	91-20-3	290.	5.0	ug/l	1
02103	Isopropylbenzene (cumene)	98-82-8	4.4	1.0	ug/l	1
07805	PAHs by SW-846 8270C					
03947	Naphthalene	91-20-3	580.	96.	ug/l	10
03951	Acenaphthylene	208-96-8	< 96.	96.	ug/l	10
03954	Acenaphthene	83-32-9	150.	96.	ug/l	10
03956	Fluorene	86-73-7	210.	96.	ug/l	10
03963	Phenanthrene	85-01-8	410.	96.	ug/l	10
03964	Anthracene	120-12-7	< 96.	96.	ug/l	10
03966	Fluoranthene	206-44-0	< 96.	96.	ug/l	10
03967	Pyrene	129-00-0	< 96.	96.	ug/l	10
03970	Benzo(a)anthracene	56-55-3	< 96.	96.	ug/l	10
03971	Chrysene	218-01-9	< 96.	96.	ug/l	10
03975	Benzo(b)fluoranthene	205-99-2	< 96.	96.	ug/l	10
03976	Benzo(k)fluoranthene	207-08-9	< 96.	96.	ug/l	10
03977	Benzo(a)pyrene	50-32-8	< 96.	96.	ug/l	10
03978	Indeno(1,2,3-cd)pyrene	193-39-5	< 96.	96.	ug/l	10
03979	Dibenz(a,h)anthracene	53-70-3	< 96.	96.	ug/l	10
03980	Benzo(g,h,i)perylene	191-24-2	< 96.	96.	ug/l	10

The reporting limits for the GC/MS semivolatile compounds were raised due to the high concentration of non-target compounds.

Commonwealth of Pennsylvania Lab Certification No. 36-037

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories Sample No. WW 3711530

Collected:10/18/2001 13:15 by RC

Account Number: 01213

Submitted: 10/20/2001 11:00
Reported: 10/29/2001 at 11:46
Discard: 11/06/2001
RW-10CI Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

W10CI

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02102	UST Volatiles by SW-846 8021B	EPA SW-846 8021B	1	10/23/2001 20:11	Melissa Mann	1
07805	PAHs by SW-846 8270C	SW-846 8270C	1	10/24/2001 23:56	Chad A. Moline	10
01146	GC VOA Water Prep	SW-846 5030B	1	10/23/2001 20:11	Melissa Mann	n.a.
07807	BNA Water Extraction	SW-846 3510C	1	10/24/2001 09:00	Amanda E. Wade	1

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3711531

Collected:10/18/2001 13:30 by RC

Account Number: 01213

Submitted: 10/20/2001 11:00
Reported: 10/29/2001 at 11:46
Discard: 11/06/2001
RW-10CE Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

W10CE

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
02102	UST Volatiles by SW-846 8021B					
00776	Benzene	71-43-2	< 1.0	1.0	ug/l	1
00777	Toluene	108-88-3	< 1.0	1.0	ug/l	1
00778	Ethylbenzene	100-41-4	< 1.0	1.0	ug/l	1
00779	Total Xylenes	1330-20-7	< 3.0	3.0	ug/l	1
00780	Methyl tert-Butyl Ether	1634-04-4	< 1.0	1.0	ug/l	1
00781	Naphthalene	91-20-3	< 5.0	5.0	ug/l	1
02103	Isopropylbenzene (cumene)	98-82-8	< 1.0	1.0	ug/l	1
07805	PAHs by SW-846 8270C					
03947	Naphthalene	91-20-3	< 9.	9.	ug/l	1
03951	Acenaphthylene	208-96-8	< 9.	9.	ug/l	1
03954	Acenaphthene	83-32-9	< 9.	9.	ug/l	1
03956	Fluorene	86-73-7	< 9.	9.	ug/l	1
03963	Phenanthrene	85-01-8	< 9.	9.	ug/l	1
03964	Anthracene	120-12-7	< 9.	9.	ug/l	1
03966	Fluoranthene	206-44-0	< 9.	9.	ug/l	1
03967	Pyrene	129-00-0	< 9.	9.	ug/l	1
03970	Benzo(a)anthracene	56-55-3	< 9.	9.	ug/l	1
03971	Chrysene	218-01-9	< 9.	9.	ug/l	1
03975	Benzo(b)fluoranthene	205-99-2	< 9.	9.	ug/l	1
03976	Benzo(k)fluoranthene	207-08-9	< 9.	9.	ug/l	1
03977	Benzo(a)pyrene	50-32-8	< 9.	9.	ug/l	1
03978	Indeno(1,2,3-cd)pyrene	193-39-5	< 9.	9.	ug/l	1
03979	Dibenz(a,h)anthracene	53-70-3	< 9.	9.	ug/l	1
03980	Benzo(g,h,i)perylene	191-24-2	< 9.	9.	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

Lancaster Laboratories Sample No. WW 3711531

Collected:10/18/2001 13:30 by RC

Account Number: 01213

Submitted: 10/20/2001 11:00
Reported: 10/29/2001 at 11:46
Discard: 11/06/2001
RW-10CE Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

W10CE

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02102	UST Volatiles by SW-846 8021B	EPA SW-846 8021B	1	10/23/2001 18:25	Melissa Mann	1
07805	PAHs by SW-846 8270C	SW-846 8270C	1	10/24/2001 19:59	Chad A. Moline	1
01146	GC VOA Water Prep	SW-846 5030B	1	10/23/2001 18:25	Melissa Mann	n.a.
07807	BNA Water Extraction	SW-846 3510C	1	10/24/2001 09:00	Amanda E. Wade	1

Lancaster Laboratories Sample No. WW 3711532

Collected:10/18/2001 18:10 by RC

Account Number: 01213

Submitted: 10/20/2001 11:00
Reported: 10/29/2001 at 11:46
Discard: 11/06/2001
MW-31CI Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

W31CI

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
02102	UST Volatiles by SW-846 8021B					
00776	Benzene	71-43-2	< 1.0	1.0	ug/l	1
00777	Toluene	108-88-3	2.0	1.0	ug/l	1
00778	Ethylbenzene	100-41-4	55.	1.0	ug/l	1
00779	Total Xylenes	1330-20-7	150.	3.0	ug/l	1
00780	Methyl tert-Butyl Ether	1634-04-4	< 1.0	1.0	ug/l	1
00781	Naphthalene	91-20-3	350.	5.0	ug/l	1
02103	Isopropylbenzene (cumene)	98-82-8	11.	1.0	ug/l	1
07605	PAHs by SW-846 8270C					
03947	Naphthalene	91-20-3	880.	94.	ug/l	10
03951	Acenaphthylene	208-96-8	< 94.	94.	ug/l	10
03954	Acenaphthene	83-32-9	< 94.	94.	ug/l	10
03956	Fluorene	86-73-7	< 94.	94.	ug/l	10
03963	Phenanthrene	85-01-8	170.	94.	ug/l	10
03964	Anthracene	120-12-7	< 94.	94.	ug/l	10
03966	Fluoranthene	206-44-0	< 94.	94.	ug/l	10
03967	Pyrene	129-00-0	< 94.	94.	ug/l	10
03970	Benzo(a)anthracene	56-55-3	< 94.	94.	ug/l	10
03971	Chrysene	218-01-9	< 94.	94.	ug/l	10
03975	Benzo(b)fluoranthene	205-99-2	< 94.	94.	ug/l	10
03976	Benzo(k)fluoranthene	207-08-9	< 94.	94.	ug/l	10
03977	Benzo(a)pyrene	50-32-8	< 94.	94.	ug/l	10
03978	Indeno(1,2,3-cd)pyrene	193-39-5	< 94.	94.	ug/l	10
03979	Dibenz(a,h)anthracene	53-70-3	< 94.	94.	ug/l	10
03980	Benzo(g,h,i)perylene	191-24-2	< 94.	94.	ug/l	10

The reporting limits for the GC/MS semivolatile compounds were raised due to the high concentration of non-target compounds.

Commonwealth of Pennsylvania Lab Certification No. 36-037

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories Sample No. WW 3711532

Collected:10/18/2001 18:10 by RC

Account Number: 01213

Submitted: 10/20/2001 11:00
Reported: 10/29/2001 at 11:46
Discard: 11/06/2001
MW-31CI Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

W31CI

Laboratory Chronicle

CAT No.	Analysis Name	Method	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
02102	UST Volatiles by SW-846 8021B	EPA SW-846 8021B	1	10/23/2001 19:36	Melissa Mann	1
07805	PAHs by SW-846 8270C	SW-846 8270C	1	10/24/2001 20:58	Chad A. Moline	10
01146	GC VOA Water Prep	SW-846 5030B	1	10/23/2001 19:36	Melissa Mann	n.a.
07807	BNA Water Extraction	SW-846 3510C	1	10/24/2001 09:00	Amanda E. Wade	1

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3711533

Collected:10/18/2001 18:30 by RC

Account Number: 01213

Submitted: 10/20/2001 11:00
Reported: 10/29/2001 at 11:46
Discard: 11/06/2001
MW-31CE Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

W31CE

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
02102	UST Volatiles by SW-846 8021B					
00776	Benzene	71-43-2	< 1.0	1.0	ug/l	1
00777	Toluene	108-88-3	< 1.0	1.0	ug/l	1
00778	Ethylbenzene	100-41-4	< 1.0	1.0	ug/l	1
00779	Total Xylenes	1330-20-7	< 3.0	3.0	ug/l	1
00780	Methyl tert-Butyl Ether	1634-04-4	< 1.0	1.0	ug/l	1
00781	Naphthalene	91-20-3	< 5.0	5.0	ug/l	1
02103	Isopropylbenzene (cumene)	98-82-8	< 1.0	1.0	ug/l	1
07805	PAHs by SW-846 8270C					
03947	Naphthalene	91-20-3	< 9.	9.	ug/l	1
03951	Acenaphthylene	208-96-8	< 9.	9.	ug/l	1
03954	Acenaphthene	83-32-9	< 9.	9.	ug/l	1
03956	Fluorene	86-73-7	< 9.	9.	ug/l	1
03963	Phenanthrene	85-01-8	< 9.	9.	ug/l	1
03964	Anthracene	120-12-7	< 9.	9.	ug/l	1
03966	Fluoranthene	206-44-0	< 9.	9.	ug/l	1
03967	Pyrene	129-00-0	< 9.	9.	ug/l	1
03970	Benzo(a)anthracene	56-55-3	< 9.	9.	ug/l	1
03971	Chrysene	218-01-9	< 9.	9.	ug/l	1
03975	Benzo(b)fluoranthene	205-99-2	< 9.	9.	ug/l	1
03976	Benzo(k)fluoranthene	207-08-9	< 9.	9.	ug/l	1
03977	Benzo(a)pyrene	50-32-8	< 9.	9.	ug/l	1
03978	Indeno(1,2,3-cd)pyrene	193-39-5	< 9.	9.	ug/l	1
03979	Dibenz(a,h)anthracene	53-70-3	< 9.	9.	ug/l	1
03980	Benzo(g,h,i)perylene	191-24-2	< 9.	9.	ug/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

MEMBER ACIL

Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3711533

Collected:10/18/2001 18:30 by RC

Account Number: 01213

Submitted: 10/20/2001 11:00
Reported: 10/29/2001 at 11:46
Discard: 11/06/2001
MW-31CE Grab Water Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

W31CE

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
02102	UST Volatiles by SW-846 8021B	EPA SW-846 8021B	1	10/23/2001 19:00	Melissa Mann	1
07805	PAHs by SW-846 8270C	SW-846 8270C	1	10/24/2001 21:57	Chad A. Moline	1
01146	GC VOA Water Prep	SW-846 5030B	1	10/23/2001 19:00	Melissa Mann	n.a.
07807	BNA Water Extraction	SW-846 3510C	1	10/24/2001 09:00	Amanda E. Wade	1

Analysis Report

Lancaster Laboratories
Where quality is a science.

NOV 5 2001

ANALYTICAL RESULTS

Prepared for:

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

717-795-8001

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 783586. Samples arrived at the laboratory on Thursday, October 25, 2001.

Client Description	Lancaster Labs Number
TW-1 Grab Water Sample	3713615

1 COPY TO Earth Tech, Inc. Attn: Mr. Dave Russell

Questions? Contact your Client Services Representative
De Brooks at (717) 656-2300.

Respectfully Submitted,

Erik J. Frederiksen
Group Leader

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Analysis Report

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3713615

Collected:10/24/2001 13:20 by RC

Account Number: 01213

Submitted: 10/25/2001 10:00
Reported: 11/01/2001 at 10:17
Discard: 11/09/2001
TW-1 Grab Water Sample
Elementis

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
00206	Total Suspended Solids	n.a.	12.	12.	mg/l	1
00212	Total Dissolved Solids	n.a.	1,360.	120.	mg/l	1
00221	Ammonia Nitrogen	7664-41-7	1.1	1.0	mg/l	1
00235	Biochemical Oxygen Demand	n.a.	< 4.1	4.1	mg/l	1
00273	Total Organic Carbon	n.a.	< 2.0	2.0	mg/l	1
01553	Chemical Oxygen Demand	n.a.	< 8.0	8.0	mg/l	1

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
00206	Total Suspended Solids	EPA 160.2	1	10/25/2001 12:30	Anne L. Kuenzli	1
00212	Total Dissolved Solids	EPA 160.1	1	10/29/2001 10:18	Anne L. Kuenzli	1
00221	Ammonia Nitrogen	EPA 350.2	1	10/30/2001 07:30	Michele L. Hanby	1
00235	Biochemical Oxygen Demand	EPA 405.1	1	10/25/2001 23:30	Nicole R. Bushong	1
00273	Total Organic Carbon	EPA 415.1	1	10/26/2001 11:26	Timothy M. Petree	1
01553	Chemical Oxygen Demand	EPA 410.2	1	10/26/2001 05:48	Susan A. Engle	1

Analysis Request/Environmental Services Chain of Custody

Lancaster Laboratories
Where quality is a science.

For Lancaster Laboratories use only
Acct. # 1213 Sample # 3713615

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Earth Tech Acct. #:
Project Name/#: Elementis PWSID #:
Project Manager: Dave Russell P.O.#
Sampler: Rick Close Quote #:
Name of state where samples were collected: PA

For lab use only
FSC:
SCR #: 1158662

(2) (3) (4) Matrix (5) Analyses Requested

Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water (Potable / NPDES)	Other	Total # of Containers	TOC 273	COD 1553	NH3 221	BOD 235	TSS 206	TDS 212			Remarks	Temperature of samples upon receipt (if requested)
TW-1	10-24-01	1320	X			X		5	X	X	X	X	X	X			One week Turnaround	

(7) **Turnaround Time Requested** (TAT) (please circle): Normal **Rush** (circled)
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax
Phone #: Fax #:

(8) **Data Package Options** (please circle if requested)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes No
Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

Relinquished by:	Date	Time	Received by:	Date	Time
K Baker	10-22-01	1550	[signature]	10-22-01	
[signature]	10-24-01	1400			
			[signature]	10/25/01	1000

Lancaster Laboratories
Where quality is a science.

ANALYTICAL RESULTS

Prepared for:

Earth Tech, Inc.
4 Neshaminy Interplex
Ste. 300
Trevose PA 19053
717-795-8001

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 783602. Samples arrived at the laboratory on Thursday, October 25, 2001.

Client Description	Lancaster Labs Number
TW-2 Grab Water Sample	3713689

1 COPY TO Earth Tech, Inc. Attn: Mr. Dave Russell

Questions? Contact your Client Services Representative
De Brooks at (717) 656-2300.

Respectfully Submitted,

Charles J. Neslund
Group Leader

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3713689

Collected:10/24/2001 13:35 by RC

Account Number: 01213

Submitted: 10/25/2001 10:00
Reported: 11/20/2001 at 20:49
Discard: 11/28/2001
TW-2 Grab Water Sample
Elementis

Earth Tech, Inc.
4 Neshaminy Interplex
Ste. 300
Trevose PA 19053

TWXX2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
00259	Mercury	7439-97-6	< 0.00020	0.00020	mg/l	1
01749	Cadmium	7440-43-9	< 0.0100	0.0100	mg/l	1
01751	Chromium	7440-47-3	< 0.0300	0.0300	mg/l	1
01753	Copper	7440-50-8	< 0.0250	0.0250	mg/l	1
01755	Lead	7439-92-1	< 0.100	0.100	mg/l	1
01761	Nickel	7440-02-0	0.0533	0.0500	mg/l	1
01766	Silver	7440-22-4	< 0.0200	0.0200	mg/l	1
01772	Zinc	7440-66-6	0.292	0.0250	mg/l	1
07035	Arsenic TR	7440-38-2	< 0.0100	0.0100	mg/l	1
00200	pH	n.a.	7.35	0.010		1
00237	Total Cyanide (water)	57-12-5	0.0057	0.0050	mg/l	1
00277	Color	n.a.	100.	50.	C P units	10
	Color reported is the APPARENT color. Comparison was done on the sample as received.					
00429	Oil & Grease	n.a.	< 0.80	0.80	mg/l	1
	Please note: USEPA Method 413.2 is not approved by New York State.					
00434	Phenols (water)	n.a.	< 0.030	0.030	mg/l	1
01554	Petroleum Hydrocarbons	n.a.	< 0.90	0.90	mg/l	1
00178	Pesticides/PCB's in Water					
00453	Gamma BHC - Lindane	58-89-9	< 0.0096	0.0096	ug/l	1
00454	Heptachlor	76-44-8	< 0.0096	0.0096	ug/l	1
00455	Aldrin	309-00-2	< 0.0096	0.0096	ug/l	1
00469	Dieldrin	60-57-1	< 0.019	0.019	ug/l	1
00477	Endrin	72-20-8	< 0.019	0.019	ug/l	1
00478	p,p-DDT	50-29-3	< 0.019	0.019	ug/l	1
00638	Endrin Aldehyde	7421-93-4	< 0.019	0.019	ug/l	1
01902	Alpha BHC	319-84-6	< 0.0096	0.0096	ug/l	1
01903	Beta BHC	319-85-7	< 0.0096	0.0096	ug/l	1
01904	Delta BHC	319-86-8	< 0.020	0.020	ug/l	1
01905	Heptachlor Epoxide	1024-57-3	< 0.0096	0.0096	ug/l	1
01906	p,p-DDE	72-55-9	< 0.019	0.019	ug/l	1
01907	p,p-DDD	72-54-8	< 0.019	0.019	ug/l	1
01908	Chlordane	57-74-9	< 0.48	0.48	ug/l	1
01909	Toxaphene	8001-35-2	< 1.0	1.0	ug/l	1

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3713689

Collected:10/24/2001 13:35 by RC

Account Number: 01213

Submitted: 10/25/2001 10:00
Reported: 11/20/2001 at 20:49
Discard: 11/28/2001
TW-2 Grab Water Sample
Elementis

Earth Tech, Inc.
4 Neshaminy Interplex
Ste. 300
Trevose PA 19053

TWXX2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
01910	Endosulfan I	959-98-8	< 0.019	0.019	ug/l	1
01911	Endosulfan II	33213-65-9	< 0.057	0.057	ug/l	1
01912	Endosulfan Sulfate	1031-07-8	< 0.019	0.019	ug/l	1
01913	PCB-1016	12674-11-2	< 0.48	0.48	ug/l	1
01914	PCB-1221	11104-28-2	< 1.0	1.0	ug/l	1
01915	PCB-1232	11141-16-5	< 0.48	0.48	ug/l	1
01916	PCB-1242	53469-21-9	< 0.48	0.48	ug/l	1
01917	PCB-1248	12672-29-6	< 0.48	0.48	ug/l	1
01918	PCB-1254	11097-69-1	< 0.48	0.48	ug/l	1
01919	PCB-1260	11096-82-5	< 0.48	0.48	ug/l	1

The Laboratory Control Sample is out low for heptachlor epoxide. Since the sample re-extraction has similiar results, and the re-extract was done out of hold, the data from the first trial is reported.
Due to interfering peaks on the chromatogram, the values reported represent the lowest reporting limits obtainable for delta-BHC.
Despite numerous cleanup methods, we were unable to reach our usual reporting limits.

00552	Acid Extractables					
00646	2-Chlorophenol	95-57-8	< 9.	9.	ug/l	1
00647	2,4-Dichlorophenol	120-83-2	< 9.	9.	ug/l	1
00648	2,4-Dimethylphenol	105-67-9	< 9.	9.	ug/l	1
00649	4,6-Dinitro-2-methylphenol	534-52-1	< 24.	24.	ug/l	1
00650	2,4-Dinitrophenol	51-28-5	< 57.	57.	ug/l	1
00651	2-Nitrophenol	88-75-5	< 9.	9.	ug/l	1
00652	4-Nitrophenol	100-02-7	< 24.	24.	ug/l	1
00653	4-Chloro-3-methylphenol	59-50-7	< 9.	9.	ug/l	1
00654	Pentachlorophenol	87-86-5	< 24.	24.	ug/l	1
00655	Phenol	108-95-2	< 9.	9.	ug/l	1
00656	2,4,6-Trichlorophenol	88-06-2	< 9.	9.	ug/l	1
00553	Base Neutrals					
00657	Acenaphthene	83-32-9	< 9.	9.	ug/l	1
00658	Acenaphthylene	208-96-8	< 9.	9.	ug/l	1
00666	bis(2-Chloroethoxy)methane	111-91-1	< 9.	9.	ug/l	1
00667	bis(2-Chloroethyl)ether	111-44-4	< 9.	9.	ug/l	1

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. WW 3713689

Collected:10/24/2001 13:35 by RC

Account Number: 01213

Submitted: 10/25/2001 10:00
Reported: 11/20/2001 at 20:49
Discard: 11/28/2001
TW-2 Grab Water Sample
Elementis

Earth Tech, Inc.
4 Neshaminy Interplex
Ste. 300
Trevose PA 19053

TWXX2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
00663	Benzo(b)fluoranthene	205-99-2	< 9.	9.	ug/l	1
00664	Benzo(g,h,i)perylene	191-24-2	< 9.	9.	ug/l	1
00665	Benzo(k)fluoranthene	207-08-9	< 9.	9.	ug/l	1
00669	bis(2-Ethylhexyl)phthalate	117-81-7	< 9.	9.	ug/l	1
00671	Butylbenzylphthalate	85-68-7	< 9.	9.	ug/l	1
00674	Chrysene	218-01-9	< 9.	9.	ug/l	1
00675	Dibenz(a,h)anthracene	53-70-3	< 9.	9.	ug/l	1
00679	3,3'-Dichlorobenzidine	91-94-1	< 19.	19.	ug/l	1
00682	Di-n-butylphthalate	84-74-2	< 9.	9.	ug/l	1
00685	Di-n-octylphthalate	117-84-0	< 9.	9.	ug/l	1
00687	Fluoranthene	206-44-0	< 9.	9.	ug/l	1
00693	Indeno(1,2,3-cd)pyrene	193-39-5	< 9.	9.	ug/l	1
00701	Pyrene	129-00-0	< 9.	9.	ug/l	1

The percent recoveries for 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol were outside QC limits low in the LCS and LCSD associated with this sample. The sample was re-extracted one day past holding time and these compounds were within QC limits in the LCS and LCSD. These compounds were not detected in either analysis. The reported result is from the initial analysis.

01387 PPL+MTBE, TBA, Xylenes by 624

00790	Trichlorofluoromethane	75-69-4	< 5.	5.	ug/l	1
00824	Acrolein	107-02-8	< 100.	100.	ug/l	1
00825	Acrylonitrile	107-13-1	< 50.	50.	ug/l	1
00826	2-Chloroethyl Vinyl Ether	110-75-8	< 10.	10.	ug/l	1
00827	Chloromethane	74-87-3	< 5.	5.	ug/l	1
00828	Bromomethane	74-83-9	< 5.	5.	ug/l	1
00829	Vinyl Chloride	75-01-4	< 5.	5.	ug/l	1
00830	Chloroethane	75-00-3	< 5.	5.	ug/l	1
00831	Methylene Chloride	75-09-2	< 5.	5.	ug/l	1
00832	1,1-Dichloroethene	75-35-4	< 5.	5.	ug/l	1
00833	1,1-Dichloroethane	75-34-3	< 5.	5.	ug/l	1
00835	Chloroform	67-66-3	< 5.	5.	ug/l	1
00836	1,2-Dichloroethane	107-06-2	< 5.	5.	ug/l	1
00837	1,1,1-Trichloroethane	71-55-6	< 5.	5.	ug/l	1
00838	Carbon Tetrachloride	56-23-5	< 5.	5.	ug/l	1
00839	Bromodichloromethane	75-27-4	< 5.	5.	ug/l	1

Lancaster Laboratories
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Lancaster Laboratories Sample No. WW 3713689

Collected:10/24/2001 13:35 by RC

Submitted: 10/25/2001 10:00
Reported: 11/20/2001 at 20:49
Discard: 11/28/2001
TW-2 Grab Water Sample
Elementis

Account Number: 01213

Earth Tech, Inc.
4 Neshaminy Interplex
Ste. 300
Trevose PA 19053

TWXX2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
00840	1,2-Dichloropropane	78-87-5	< 5.	5.	ug/l	1
00841	trans-1,3-Dichloropropene	10061-02-6	< 5.	5.	ug/l	1
00842	Trichloroethene	79-01-6	< 5.	5.	ug/l	1
00843	Benzene	71-43-2	< 5.	5.	ug/l	1
00844	cis-1,3-Dichloropropene	10061-01-5	< 5.	5.	ug/l	1
00845	1,1,2-Trichloroethane	79-00-5	< 5.	5.	ug/l	1
00846	Dibromochloromethane	124-48-1	< 5.	5.	ug/l	1
00847	Bromoform	75-25-2	< 5.	5.	ug/l	1
00848	Tetrachloroethene	127-18-4	< 5.	5.	ug/l	1
00849	1,1,2,2-Tetrachloroethane	79-34-5	< 5.	5.	ug/l	1
00850	Toluene	108-88-3	< 5.	5.	ug/l	1
00851	Chlorobenzene	108-90-7	< 5.	5.	ug/l	1
00852	Ethylbenzene	100-41-4	< 5.	5.	ug/l	1
01385	Methyl Tertiary Butyl Ether	1634-04-4	< 5.	5.	ug/l	1
01386	t-Butyl Alcohol	75-65-0	< 100.	100.	ug/l	1
03535	trans-1,2-Dichloroethene	156-60-5	< 5.	5.	ug/l	1
03549	cis-1,2-Dichloroethene	156-59-2	< 5.	5.	ug/l	1
03589	Xylene (total)	1330-20-7	< 5.	5.	ug/l	1

2-Chloroethyl vinyl ether is an acid labile compound and may not be recovered in an acid preserved sample.

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
00259	Mercury	SW-846 7470A	2	10/31/2001 08:31	Deborah A. Krady	1
01749	Cadmium	SW-846 6010B	1	10/30/2001 07:15	Donna R. Sackett	1
01751	Chromium	SW-846 6010B	1	10/30/2001 07:15	Donna R. Sackett	1
01753	Copper	SW-846 6010B	1	10/30/2001 07:15	Donna R. Sackett	1
01755	Lead	SW-846 6010B	1	10/30/2001 07:15	Donna R. Sackett	1
01761	Nickel	SW-846 6010B	1	10/30/2001 07:15	Donna R. Sackett	1
01766	Silver	SW-846 6010B	1	10/30/2001 07:15	Donna R. Sackett	1
01772	Zinc	SW-846 6010B	1	10/30/2001 07:15	Donna R. Sackett	1
07035	Arsenic TR	SW-846 6010B	1	10/30/2001 07:15	Donna R. Sackett	1
00200	pH	EPA 150.1	1	10/25/2001 18:45	Luz M. Groff	1

Lancaster Laboratories
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Lancaster Laboratories Sample No. WW 3713689

Collected:10/24/2001 13:35 by RC

Submitted: 10/25/2001 10:00
Reported: 11/20/2001 at 20:49
Discard: 11/28/2001
TW-2 Grab Water Sample
Elementis

Account Number: 01213

Earth Tech, Inc.
4 Neshaminy Interplex
Ste. 300
Trevose PA 19053

TWXX2

00237	Total Cyanide (water)	EPA 335.4	1	10/26/2001 13:58	Venia M. McFadden	1
00277	Color	EPA 110.2	1	10/25/2001 21:10	Daniel S. Smith	10
00429	Oil & Grease	EPA 413.2	1	10/30/2001 15:14	Michelle Heidig	1
00434	Phenols (water)	EPA 420.2	1	10/30/2001 15:57	Venia M. McFadden	1
01554	Petroleum Hydrocarbons	EPA 418.1	1	10/30/2001 15:17	Michelle Heidig	1
00178	Pesticides/PCB's in Water	EPA 608	1	11/01/2001 20:56	Michele D. Hamilton	1
00552	Acid Extractables	EPA 625	1	10/29/2001 22:30	Linda M. Hartenstine	1
00553	Base Neutrals	EPA 625	1	10/29/2001 22:30	Linda M. Hartenstine	1
00554	Base Neutrals (cont)	EPA 625	1	10/29/2001 22:30	Linda M. Hartenstine	1
01387	PPL+MTBE, TBA, Xylenes by 624	EPA 624	1	10/25/2001 17:14	Robin C. Runkle	1
00491	Phenol Distillation (water)	EPA 420.1	1	10/30/2001 09:45	Cheryl L. Robinson	1
00492	Cyanide Water Distillation	EPA 335.4	1	10/26/2001 09:08	James S. Mathiot	1
00817	Water Sample Pest. Extraction	EPA 608	1	10/29/2001 16:30	Wanda F. Oswald	1
01848	WW SW846 ICP Digest (tot rec)	SW-846 3005A	1	10/29/2001 19:00	James L. Mertz	1
05713	WW SW846 Hg Digest	SW-846 7470A	2	10/30/2001 21:33	Nelli S. Markaryan	1
08108	625 Water Extraction	EPA 625	1	10/27/2001 09:00	John A. Myers	1

Analysis Request/Environmental Services Chain of Custody

For Lancaster Laboratories use only
Acct. # 1213 Sample # 3713689

Lancaster Laboratories
Where quality is a science.

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: EArth Tech Acct. #: ______
Project Name/#: Elementis PWSID #: ______
Project Manager: DAVE Russell P.O.# ______
Sampler: Rick Close Quote #: ______
Name of state where samples were collected: PA

For lab use only
FSC: ______
SCR #: 1158604

(2) Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	(4) Matrix: Soil	Water (☐ Potable ☐ NPDES, Check if applicable)	Other	Total # of Containers	(5) Analyses Requested: Pheno 434	O+G 429+1554	EPA 624 1387	Metals (See List)	Pes PC 178	EPA 625 553M 553	CN 237	Color pH 277 200	Remarks	(6) Temperature of samples upon receipt (if requested)
TW-2	10-24-01	1335	X			X		14	X	X	X	X	X	X	X	X	One week Turn Around	

(7) **Turnaround Time Requested** (TAT) (please circle): Normal **Rush** (circled)
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed: ______
Rush results requested by (please circle): Phone Fax
Phone #: ______ Fax #: ______

(8) **Data Package Options** (please circle if requested)
QC Summary Type VI (Raw Data)
Type I (Tier I) GLP
Type II (Tier II) Other
Type III (NJ Red. Del.)
Type IV (CLP)

SDG Complete? Yes No
Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal Chain of Custody required? Yes No

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	10/24/01	0520	[signature]	10-24-01	1400
[signature]	10-24-01	1400			
			Kathy Binkley	10-25-01	1000

Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client

2102 Rev. 3/7/01

Lancaster Laboratories
Where quality is a science.

ANALYTICAL RESULTS

Prepared for:

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

518-458-1313

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 782915. Samples arrived at the laboratory on Friday, October 19, 2001.

Client Description	Lancaster Labs Number
MW-11 Air Start Grab Tedlar Bag Sample	3710309
MW-11 Air Stop Grab Tedlar Bag Sample	3710310

METHODOLOGY

The specific methodologies used in obtaining the enclosed analytical results are indicated on the laboratory chronicles.

1 COPY TO Earth Tech, Inc. Attn: Mr. Dave Russell

Questions? Contact your Client Services Representative
De Brooks at (717) 656-2300.

Respectfully Submitted,

Robert E. Mellinger
Sr Chemist/Coordinator

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. AQ 3710309

Collected:10/15/2001 14:30 by RC

Account Number: 01213

Submitted: 10/19/2001 09:25
Reported: 10/26/2001 at 07:31
Discard: 11/10/2001
MW-11 Air Start Grab Tedlar Bag Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
07869	TO 14 VOA Ext. List Tedlar	EPA TO14	1	10/21/2001 01:44	George M. Main, Jr.	50
07870	TO 14 VOA Ext List cont Tedlar	EPA TO14	1	10/21/2001 01:44	George M. Main, Jr.	50

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VOLATILE ORGANICS IN AIR
TEDLAR BAG SAMPLE
ANALYSIS DATA SHEET

Sample No.: MW-11 START Date Collected: 10/15/01 Date Received: 10/19/01
Lab Sample ID: 3710309 Date Analyzed: 10/21/01 Time Analyzed: 01:44
Injection Volume: 500 cc Nominal Volume: 250 cc Dilution Factor: 50.0
Instrument ID: HP4224 Lab File ID: C:\HPCHEM\1\DATA\OCT19\1101010.D

CAS RN	COMPOUND NAME	CONCENTRATION (ppb(v))	Q
75-71-8	Dichlorodifluoromethane	50	U
76-14-2	Freon 114	50	U
74-87-3	Chloromethane	50	U
75-01-4	Vinyl Chloride	50	U
74-83-9	Bromomethane	50	U
75-00-3	Chloroethane	50	U
75-69-4	Trichlorofluoromethane	50	U
75-35-4	1,1-Dichloroethene	50	U
76-13-1	Freon 113	50	U
107-05-1	3-Chloropropene	50	U
75-09-2	Methylene Chloride	1100	D
75-34-3	1,1-Dichloroethane	50	U
156-59-2	cis-1,2-Dichloroethene	50	U
67-66-3	Chloroform	50	U
71-55-6	1,1,1-Trichloroethane	50	U
56-23-5	Carbon Tetrachloride	50	U
107-06-2	1,2-Dichloroethane	50	U
71-43-2	Benzene	67	D
79-01-6	Trichloroethene	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
108-88-3	Toluene	700	D
10061-02-6	trans-1,3-Dichloropropene	50	U
79-00-5	1,1,2-Trichloroethane	50	U
127-18-4	Tetrachloroethene	50	U
106-93-4	1,2-Dibromoethane	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	1600	D
1330-20-7	m/p-Xylene	3200	D
95-47-6	o-Xylene	450	D
100-42-5	Styrene	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
622-96-8	4-Ethyltoluene	220	D
108-67-8	1,3,5-Trimethylbenzene	140	D

U = Compound was undetected at the specified limit of quantitation.
B = Compound was found in method blank. D = analysis of diluted sample.
NOTE: Limits of quantitation were raised due to the high concentration of volatile organic compounds in this sample.

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VOLATILE ORGANICS IN AIR
TEDLAR BAG SAMPLE
ANALYSIS DATA SHEET

Sample No.: MW-11 START Date Collected: 10/15/01 Date Received: 10/19/01
Lab Sample ID: 3710309 Date Analyzed: 10/21/01 Time Analyzed: 01:44
Injection Volume: 500 cc Nominal Volume: 250 cc Dilution Factor: 50.0
Instrument ID: HP4224 Lab File ID: C:\HPCHEM\1\DATA\OCT19\1101010.D

CAS RN	COMPOUND NAME	CONCENTRATION (ppb(v))	Q
95-63-6	1,2,4-Trimethylbenzene	160	D
541-73-1	1,3-Dichlorobenzene	50	U
106-46-7	1,4-Dichlorobenzene	50	U
100-44-7	Benzyl chloride	50	U
95-50-1	1,2-Dichlorobenzene	50	U
120-82-1	1,2,4-Trichlorobenzene	50	U
87-68-3	Hexachlorobutadiene	50	U

U = Compound was undetected at the specified limit of quantitation.
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NOTE: Limits of quantitation were raised due to the high concentration of volatile organic compounds in this sample.

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-655-2681

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. AQ 3710310

Collected:10/18/2001 07:45 by RC

Account Number: 01213

Submitted: 10/19/2001 09:25
Reported: 10/26/2001 at 07:31
Discard: 11/10/2001
MW-11 Air Stop Grab Tedlar Bag Sample
Elementis - PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor

Commonwealth of Pennsylvania Lab Certification No. 36-037

Laboratory Chronicle

CAT No.	Analysis Name	Method	Analysis Trial#	Analysis Date and Time	Analyst	Dilution Factor
07869	TO 14 VOA Ext. List Tedlar	EPA TO14	1	10/21/2001 03:12	George M. Main, Jr.	100
07870	TO 14 VOA Ext List cont Tedlar	EPA TO14	1	10/21/2001 03:12	George M. Main, Jr.	100

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VOLATILE ORGANICS IN AIR
TEDLAR BAG SAMPLE
ANALYSIS DATA SHEET

Sample No.: MW-11 STOP Date Collected: 10/18/01 Date Received: 10/19/01
Lab Sample ID: 3710310 Date Analyzed: 10/21/01 Time Analyzed: 03:12
Injection Volume: 500 cc Nominal Volume: 250 cc Dilution Factor: 100.0
Instrument ID: HP4224 Lab File ID: C:\HPCHEM\1\DATA\OCT19\1301012.D

CAS RN	COMPOUND NAME	CONCENTRATION (ppb(v))	Q
75-71-8	Dichlorodifluoromethane	100	U
76-14-2	Freon 114	100	U
74-87-3	Chloromethane	100	U
75-01-4	Vinyl Chloride	100	U
74-83-9	Bromomethane	100	U
75-00-3	Chloroethane	100	U
75-69-4	Trichlorofluoromethane	100	U
75-35-4	1,1-Dichloroethene	100	U
76-13-1	Freon 113	100	U
107-05-1	3-Chloropropene	100	U
75-09-2	Methylene Chloride	2200	D
75-34-3	1,1-Dichloroethane	100	U
156-59-2	cis-1,2-Dichloroethene	100	U
67-66-3	Chloroform	100	U
71-55-6	1,1,1-Trichloroethane	100	U
56-23-5	Carbon Tetrachloride	100	U
107-06-2	1,2-Dichloroethane	100	U
71-43-2	Benzene	140	D
79-01-6	Trichloroethene	100	U
78-87-5	1,2-Dichloropropane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
108-88-3	Toluene	670	D
10061-02-6	trans-1,3-Dichloropropene	100	U
79-00-5	1,1,2-Trichloroethane	100	U
127-18-4	Tetrachloroethene	100	U
106-93-4	1,2-Dibromoethane	100	U
108-90-7	Chlorobenzene	100	U
100-41-4	Ethylbenzene	1700	D
1330-20-7	m/p-Xylene	2400	D
95-47-6	o-Xylene	300	D
100-42-5	Styrene	100	U
79-34-5	1,1,2,2-Tetrachloroethane	100	U
622-96-8	4-Ethyltoluene	190	D
108-67-8	1,3,5-Trimethylbenzene	100	U

U = Compound was undetected at the specified limit of quantitation.
B = Compound was found in method blank. D = analysis of diluted sample.
NOTE: Limits of quantitation were raised due to the high concentration of volatile organic compounds in this sample.

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Lancaster Laboratories
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VOLATILE ORGANICS IN AIR
TEDLAR BAG SAMPLE
ANALYSIS DATA SHEET

Sample No.: MW-11 STOP Date Collected: 10/18/01 Date Received: 10/19/01
Lab Sample ID: 3710310 Date Analyzed: 10/21/01 Time Analyzed: 03:12
Injection Volume: 500 cc Nominal Volume: 250 cc Dilution Factor: 100.0
Instrument ID: HP4224 Lab File ID: C:\HPCHEM\1\DATA\OCT19\1301012.D

CAS RN	COMPOUND NAME	CONCENTRATION (ppb(v))	Q
95-63-6	1,2,4-Trimethylbenzene	120	D
541-73-1	1,3-Dichlorobenzene	100	U
106-46-7	1,4-Dichlorobenzene	100	U
100-44-7	Benzyl chloride	100	U
95-50-1	1,2-Dichlorobenzene	100	U
120-82-1	1,2,4-Trichlorobenzene	100	U
87-68-3	Hexachlorobutadiene	100	U

U = Compound was undetected at the specified limit of quantitation.
B = Compound was found in method blank. D = analysis of diluted sample.
NOTE: Limits of quantitation were raised due to the high concentration of volatile organic compounds in this sample.

Lancaster Laboratories
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Quality Control Summary

Client Name: Earth Tech, Inc. Group Number: 782915
Reported: 10/26/01 at 07:31 AM

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: A012941AA	Sample number(s): 3710309-3710310							
Dichlorodifluoromethane	< 1.	1.	ppbv					
Freon 114	< 1.	1.	ppbv					
Chloromethane	< 1.	1.	ppbv					
Vinyl Chloride	< 1.	1.	ppbv	82		42-168		
Bromomethane	< 1.	1.	ppbv					
Chloroethane	< 1.	1.	ppbv					
Trichlorofluoromethane	< 1.	1.	ppbv					
1,1-Dichloroethene	< 1.	1.	ppbv					
Freon 113	< 1.	1.	ppbv					
3-Chloropropene	< 1.	1.	ppbv					
Methylene Chloride	< 1.	1.	ppbv					
1,1-Dichloroethane	< 1.	1.	ppbv					
cis-1,2-Dichloroethene	< 1.	1.	ppbv					
Chloroform	< 1.	1.	ppbv					
1,1,1-Trichloroethane	< 1.	1.	ppbv	75		62-182		
Carbon Tetrachloride	< 1.	1.	ppbv					
1,2-Dichloroethane	< 1.	1.	ppbv					
Benzene	< 1.	1.	ppbv	71		58-174		
Trichloroethene	< 1.	1.	ppbv	73		56-157		
1,2-Dichloropropane	< 1.	1.	ppbv					
cis-1,3-Dichloropropene	< 1.	1.	ppbv					
Toluene	< 1.	1.	ppbv					
trans-1,3-Dichloropropene	< 1.	1.	ppbv					
1,1,2-Trichloroethane	< 1.	1.	ppbv					
Tetrachloroethene	< 1.	1.	ppbv					
1,2-Dibromoethane	< 1.	1.	ppbv					
Chlorobenzene	< 1.	1.	ppbv					
Ethylbenzene	< 1.	1.	ppbv	84		61-171		
m/p-Xylene	< 1.	1.	ppbv					
o-Xylene	< 1.	1.	ppbv					
Styrene	< 1.	1.	ppbv					
1,1,2,2-Tetrachloroethane	< 1.	1.	ppbv					
4-Ethyltoluene	< 1.	1.	ppbv					
1,3,5-Trimethylbenzene	< 1.	1.	ppbv					
1,2,4-Trimethylbenzene	< 1.	1.	ppbv					
1,3-Dichlorobenzene	< 1.	1.	ppbv					
1,4-Dichlorobenzene	< 1.	1.	ppbv	70		48-137		
Benzyl chloride	< 1.	1.	ppbv					
1,2-Dichlorobenzene	< 1.	1.	ppbv					
1,2,4-Trichlorobenzene	< 1.	1.	ppbv					
Hexachlorobutadiene	< 1.	1.	ppbv					

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.

MEMBER ACIL
Lancaster Laboratories, Inc.
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

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Quality Control Summary

Client Name: Earth Tech, Inc.
Reported: 10/26/01 at 07:31 AM

Group Number: 782915

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.

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Analysis Request/ Environmental Services Chain of Custody

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For Lancaster Laboratories use only
Acct. # 1213 Sample # 3710309-10

Please print. Instructions on reverse side correspond with circled numbers.

(1) Client: Earth Tech Acct. #:
Project Name/#: Elementis PWSID #:
Project Manager: Dave Russell P.O.#
Sampler: Rick Close/Jason Hovis Quote #:
Name of state where samples were collected: PA

For lab use only
FSC:
SCR #:

(2) Sample Identification	Date Collected	Time Collected	(3) Grab	Composite	Matrix (4): Soil	Water (☐ Potable ☐ NPDES)	Other	Total # of Containers	(5) Analyses Requested: TO-14	Remarks	Temperature of samples upon receipt (if requested)
mw-11 AIR START	10-15-01	1430	X				AIR		X		
mw-11 AIR STOP	10-18-01	0745	X				AIR		X		

(7) **Turnaround Time Requested** (TAT) (please circle): (Normal) Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax
Phone #: Fax #:

(8) **Data Package Options** (please circle if requested)
QC Summary
Type I (Tier I)
Type II (Tier II)
Type III (NJ Red. Del.)
Type IV (CLP)
Type VI (Raw Data)
GLP
Other

SDG Complete? Yes No

Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes No

Relinquished by:	Date	Time	Received by:	Date	Time
	10-18-01	1440			
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	10/19/01	0725

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ANALYTICAL RESULTS

Prepared for:

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

717-795-8001

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 783081. Samples arrived at the laboratory on Saturday, October 20, 2001.

Client Description	Lancaster Labs Number
RW-10 Air Stop Grab Tedlar Bag Sample	3711188

1 COPY TO Earth Tech Attn: Dave Russell

Questions? Contact your Client Services Representative
De Brooks at (717) 656-2300.

Respectfully Submitted,

Robert E. Mellinger
Sr Chemist/Coordinator

Lancaster Laboratories
Where quality is a science.

Lancaster Laboratories Sample No. AQ 3711188

Collected:10/19/2001 13:00 by RC

Account Number: 01213

Submitted: 10/20/2001 16:45
Reported: 10/26/2001 at 07:32
Discard: 11/26/2001
RW-10 Air Stop Grab Tedlar Bag Sample
Elementis, PA

Earth Tech, Inc.
2 Market Plaza Way
Mechanicsburg PA 17055-5659

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Units	Dilution Factor
	Commonwealth of Pennsylvania Lab Certification No. 36-037					
	Commonwealth of Pennsylvania Lab Certification No. 36-037					

Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
07869	TO 14 VOA Ext. List Tedlar	EPA TO14	1	10/21/2001 20:03	Matthew S. Thomas	1
07870	TO 14 VOA Ext List cont Tedlar	EPA TO14	1	10/21/2001 19:22	Matthew S. Thomas	5
07870	TO 14 VOA Ext List cont Tedlar	EPA TO14	1	10/21/2001 20:03	Matthew S. Thomas	1

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VOLATILE ORGANICS IN AIR
TEDLAR BAG SAMPLE
ANALYSIS DATA SHEET

Sample No.: RW-10 STOP Date Collected: 10/19/01 Date Received: 10/20/01
Lab Sample ID: 3711188 Date Analyzed: 10/21/01 Time Analyzed: 20:03
Injection Volume: 250 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID: HP4224 Lab File ID: C:\HPCHEM\1\DATA\OCT21\0801007.D

CAS RN	COMPOUND NAME	CONCENTRATION (ppb(v))	Q
75-71-8	Dichlorodifluoromethane	1	U
76-14-2	Freon 114	1	U
74-87-3	Chloromethane	1	U
75-01-4	Vinyl Chloride	1	U
74-83-9	Bromomethane	1	U
75-00-3	Chloroethane	1	U
75-69-4	Trichlorofluoromethane	1	U
75-35-4	1,1-Dichloroethene	1	U
76-13-1	Freon 113	1	U
107-05-1	3-Chloropropene	1	U
75-09-2	Methylene Chloride	3	
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	1	U
67-66-3	Chloroform	2	
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon Tetrachloride	1	U
107-06-2	1,2-Dichloroethane	1	U
71-43-2	Benzene	21	
79-01-6	Trichloroethene	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
108-88-3	Toluene	77	
10061-02-6	trans-1,3-Dichloropropene	1	U
79-00-5	1,1,2-Trichloroethane	1	U
127-18-4	Tetrachloroethene	1	U
106-93-4	1,2-Dibromoethane	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	71	
1330-20-7	m/p-Xylene	350	D
95-47-6	o-Xylene	200	D
100-42-5	Styrene	1	U
79-34-5	1,1,2,2-Tetrachloroethane	1	U
622-96-8	4-Ethyltoluene	89	
108-67-8	1,3,5-Trimethylbenzene	54	

U = Compound was undetected at the specified limit of quantitation.
B = Compound was found in method blank. D = analysis of diluted sample.

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VOLATILE ORGANICS IN AIR
TEDLAR BAG SAMPLE
ANALYSIS DATA SHEET

Sample No.: RW-10 STOP Date Collected: 10/19/01 Date Received: 10/20/01
Lab Sample ID: 3711188 Date Analyzed: 10/21/01 Time Analyzed: 20:03
Injection Volume: 250 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID: HP4224 Lab File ID: C:\HPCHEM\1\DATA\OCT21\0801007.D

CAS RN	COMPOUND NAME	CONCENTRATION (ppb(v))	Q
95-63-6	1,2,4-Trimethylbenzene	75	
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
100-44-7	Benzyl chloride	1	U
95-50-1	1,2-Dichlorobenzene	1	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	1	U

U = Compound was undetected at the specified limit of quantitation.
B = Compound was found in method blank. D = analysis of diluted sample.

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Quality Control Summary

Client Name: Earth Tech, Inc. Group Number: 783081
Reported: 10/26/01 at 07:32 AM

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: A012951AA	Sample number(s): 3711188							
Dichlorodifluoromethane	< 1.	1.	ppbv					
Freon 114	< 1.	1.	ppbv					
Chloromethane	< 1.	1.	ppbv					
Vinyl Chloride	< 1.	1.	ppbv	79		42-168		
Bromomethane	< 1.	1.	ppbv					
Chloroethane	< 1.	1.	ppbv					
Trichlorofluoromethane	< 1.	1.	ppbv					
1,1-Dichloroethene	< 1.	1.	ppbv					
Freon 113	< 1.	1.	ppbv					
3-Chloropropene	< 1.	1.	ppbv					
Methylene Chloride	< 1.	1.	ppbv					
1,1-Dichloroethane	< 1.	1.	ppbv					
cis-1,2-Dichloroethene	< 1.	1.	ppbv					
Chloroform	< 1.	1.	ppbv					
1,1,1-Trichloroethane	< 1.	1.	ppbv	93		62-182		
Carbon Tetrachloride	< 1.	1.	ppbv					
1,2-Dichloroethane	< 1.	1.	ppbv					
Benzene	< 1.	1.	ppbv	91		58-174		
Trichloroethene	< 1.	1.	ppbv	90		56-157		
1,2-Dichloropropane	< 1.	1.	ppbv					
cis-1,3-Dichloropropene	< 1.	1.	ppbv					
Toluene	< 1.	1.	ppbv					
trans-1,3-Dichloropropene	< 1.	1.	ppbv					
1,1,2-Trichloroethane	< 1.	1.	ppbv					
Tetrachloroethene	< 1.	1.	ppbv					
1,2-Dibromoethane	< 1.	1.	ppbv					
Chlorobenzene	< 1.	1.	ppbv					
Ethylbenzene	< 1.	1.	ppbv	94		61-171		
m/p-Xylene	< 1.	1.	ppbv					
o-Xylene	< 1.	1.	ppbv					
Styrene	< 1.	1.	ppbv					
1,1,2,2-Tetrachloroethane	< 1.	1.	ppbv					
4-Ethyltoluene	< 1.	1.	ppbv					
1,3,5-Trimethylbenzene	< 1.	1.	ppbv					
1,2,4-Trimethylbenzene	< 1.	1.	ppbv					
1,3-Dichlorobenzene	< 1.	1.	ppbv					
1,4-Dichlorobenzene	< 1.	1.	ppbv	62		48-137		
Benzyl chloride	< 1.	1.	ppbv					
1,2-Dichlorobenzene	< 1.	1.	ppbv					
1,2,4-Trichlorobenzene	< 1.	1.	ppbv					
Hexachlorobutadiene	< 1.	1.	ppbv					

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The background result was more than four times the spike added.

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Quality Control Summary

Client Name: Earth Tech, Inc.
Reported: 10/26/01 at 07:32 AM

Group Number: 783081

*- Outside of specification
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Analysis Request/ Environmental Services Chain of Custody

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For Lancaster Laboratories use only
Acct. # 1213 Sample # 3711188

Please print. Instructions on reverse side correspond with circled numbers.

(1)
Client: Earth Tech Acct. #:
Project Name/#: Elementis PWSID #:
Project Manager: Dave Russell P.O.#
Sampler: Rick Close/Jason Hovis Quote #:
Name of state where samples were collected: PA

(2) (3) (4) (5)

Sample Identification	Date Collected	Time Collected	Grab (3)	Composite (3)	Matrix (4): Soil	Water (Potable / NPDES)	Other: Air	Total # of Containers	Analyses Requested (5): TO-14	Remarks	Temperature of samples upon receipt (if requested)
RW-10 AIR STOP	10-19-01	1310	X				X		X	Sample collected from Fuel oil Impacted Area	

For lab use only
FSC:
SCR #:

(7) **Turnaround Time Requested** (TAT) (please circle): (Normal) Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax
Phone #: Fax #:

(8) **Data Package Options** (please circle if requested)
QC Summary
Type I (Tier I)
Type II (Tier II)
Type III (NJ Red. Del.)
Type IV (CLP)
Type VI (Raw Data)
GLP
Other

SDG Complete? Yes No

Site-specific QC required? Yes No
(If yes, indicate QC sample and submit triplicate volume.)

Internal Chain of Custody required? Yes No

Relinquished by:	Date	Time	Received by:	Date	Time
	10-19-01	1400			
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
				10/22/01	1100